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Original Contributions.

PATHOGENY OF ROOT ABSORPTION AND ALVEOLAR ABSCESS.

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Elsewhere I have demonstrated pathology of the alveolar process and teeth, separately from the viewpoint of the law of economy of growth or use and disuse of structures. The two in relation to each other under the operations of the same law now require attention. In evolution man is lessening jaws and teeth for the benefit of the brain. This is brought about by reduction in size or exclusion of teeth in the anterior and posterior part of the mouth (third molars and lateral incisors) and by rapid tooth decay. So unstable are the jaws and teeth that not infrequently other teeth—the central incisors, cuspids, bicuspids and molars, for instance—are checked in development. From atavism extra teeth develop. So unstable is the alveolar process that were man to live long enough he would lose his second set of teeth by osteomalacia or senile atrophy, then normal but in essence atavistic. Continuous shedding of teeth, as is done by some snakes, the elephant, etc., is an expression of osteomalacia. The widespread influence and operation of this process is shown in the lost teeth of birds, of the duck-bill and of the Greenland whale.

Absorption of the alveolar process is always resultant upon irritation and inflammation. The process being doubly transitory, and the nerves being end organs, the slightest irritation sets up inflammation. This may by erupting tooth, pressure in regulation, tooth-wedging for filling, or local or constitutional causes produce interstitial gingivitis.

Because of this instability, any irritation and inflammation upon the alveolar process may shed the teeth at any period of life. From

this source came the destruction of the alveolar process by crowns and bridgework, and the old methods of correction of irregularities.

Absorption of tooth roots is a potent destructive element. Roots of teeth with dead pulps are absorbed more readily than those with live pulps. The process is that of systemic removal of foreign or partially foreign substances.

Three forms of absorption result from inflammation of the alveolar process—halisteresis, Volkmann's perforating canal, and the osteoclast or lacunar absorption. The first two are confined to the alveolar process, the last (osteoclast) affects both process and tooth

FIG. 1.

root. The three are active when round-cell inflammation is present. Extracted or erupting teeth, irritation at the end of the root by putrescent gases or inflammation by injury thus cause absorption of the alveolar process. Osteoclast absorption may or may not result. When it does root absorption occurs. The location depends upon the center of inflammation and whether it be in contact with the root.

While absorption is said to be physiologic, it is not more so than all pathologic processes which are physiologic under certain conditions (fetal life, etc.), but under the conditions in which they

are found have a morbid element destructive of the parts concerned for the benefit of the body as a whole. Absorption is a pathologic or inflammatory condition, and round-cell infiltration is generally found in connection with absorption. The alveolar process is composed of lime salts or earthy substances and animal matter or the trabeculæ. The trabeculæ hold the lime salts in position. In inflammation the lime salts are removed by the three forms of absorption already mentioned, leaving the animal matter in position. If from any cause the trabeculæ be destroyed the osteoclasts have no support and absorption cannot take place.

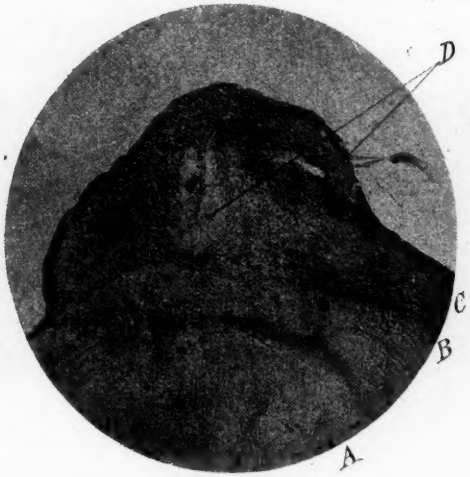


FIG. 2.

When a permanent tooth begins to erupt resultant irritation causes inflammation in the surrounding alveolar process, resulting in absorption of the lime salts. This absorption takes place by halisteresis, Volkmann's perforating canal and osteoclast absorption. The osteoclasts destroy everything that retards the advancing tooth, hence the removal of the roots of the temporary teeth. The coming tooth need not be in contact with the absorbed root, since inflammation may extend quite a distance beyond the advancing crown. Absorbed and absorber, according to Sudduth, must be in direct contact, hence osteoclasts are found in close proximity to the roots of the teeth. The papilla or sac has no direct connection

with root absorption except so far as the fibrous tissue therein contained—like the trabeculæ—may hold the osteoclasts in connection with the tooth root.

The question arises, "Why are not the roots of temporary teeth having dead pulps absorbed on the approach of the erupting teeth?" To understand why, formation of an alveolar abscess or destruction of the process without abscess must be studied. Irritation producing inflammation is transferred to the pulp canal instead of being in the alveolar process. The products resulting from the dead pulp irritate the peridental membrane, Fig. I, which begins to thicken. (Figs. I, II, IV illustrate peridental abscess upon the side of the root, and demonstrate alveolar abscess as well, the only difference being the cause and location of irritation.) This inflammation pro-

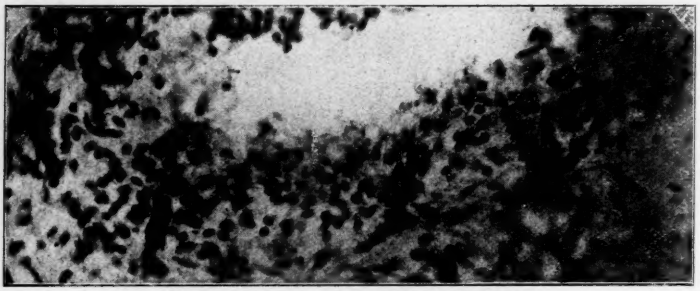


FIG. 3.

duces halisteresis and Volkmann's perforating canal absorption. The lime salts in the inflamed area are thus destroyed. The fibrous tissues or trabeculæ become organized and later break down into pus, Fig. II.

Fig. III is a high magnification showing round-cell infiltration and breaking down of tissue into pus. The pyogenic membrane forming the abscess walls is well shown. Fig. IV shows a fully developed abscess.

In temporary teeth with large pulps and apical foramina, when death results, large quantities of gas escape into the tissue, producing irritation, inflammation and alveolar destruction, and the irritation may be so severe that not only are the lime salts destroyed but also the trabeculæ and the root attachments which hold the osteoclasts in position and are without abscess.

Fig. V, taken from Black, Vol. 1, page 936, American System of Dentistry, demonstrates the condition just described. It will be noticed that there is a space in the alveolar process and that the apical end of the root is denuded, the fibrous tissue being entirely destroyed. In either case the osteoclasts cannot come in contact with the root of the tooth, wherefore root absorption is impossible. In other words, if the trabeculæ of the alveolar process which hold the osteoclasts be not in direct contact with the root of the tooth,

Fig. 4.

irritation and inflammation caused by the erupting teeth cannot produce root absorption.

With the alveolar process, considering its sensitiveness to irritation and methods of absorption, it is not difficult to understand why replantation and implantation of teeth should so often be but partially successful. Teeth that have been knocked out, extracted by mistake, or implanted in the alveolar process in its constructive stage, may do well. When the constructive stages cease the process becomes sensitive and absorption rapidly ensues, so difficulty occurs. If a tooth has been extracted from or a cavity drilled into the

alveolar process for the purpose of implantation or transplantation, inflammation at once occurs and halisteresis and Volkmann's perforating canal absorption commence. When a foreign body is implanted in the cavity it acts more quickly. When the lime salts are destroyed about the cavity the fibrous tissue or trabeculæ may become organized (if the irritation is not too severe), fit tightly about the irregular root and give support to the osteoclasts, which commence to absorb the foreign substance.

Absorption of the roots of teeth in connection with crown and bridgework is far from rare. Crowns or bridges or too great pressure from the opposite jaw and teeth result in irritation and inflammation in and about the root, causing bone and root absorption. On the other hand, if the irritation be not too severe the osteoblasts may deposit new bone material, thus tightening the teeth in the jaws.

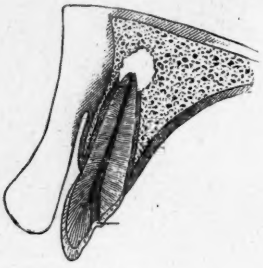


FIG. 5.

This is especially true of the early constructive stage of the process. The evolution of the process intended it to support one crown on each single or double root. When more force is applied the process naturally gives way.

Fig. VI is the cross-section of the jaw, alveolar process and tooth of a dog which had interstitial gingivitis. It shows the alveolar process, peridental membrane, root of tooth and pulp chamber. It also shows root absorption (osteoclast) commencing at three localities, R A, along the side, due to interstitial gingivitis.

While the jaws and alveolar process are in the constructive stage, if the person be healthy there is little or no danger of osteomalacia or senile atrophy. The constructive stage usually extends through the third and into the fourth period of stress. On the other hand, with a neurotic or degenerate child osteomalacia or senile atrophy

may occur at any period from that precocity which is an expression of premature senility. What is true of neuroses or degeneracy is likewise true of disease. Diseases involving the nervous system cause early in life inflammation of the alveolar process with absorption. If such marked results obtain in the constructive stage of the

FIG. 6.

alveolar process, what is to be expected later in life when the process has reached its acme.

It is usually after this period that implantation, replantation and often regulation of teeth are done. The operator must therefore be familiar with the patient's system. If an eliminating organ be not doing its work, or if stomach or intestinal digestion from liver insufficiency result in autointoxication, success cannot be expected. The dentist should know the condition of his patient's system as well as the condition of the alveolar process. If interstitial gingivitis be

present, due to systemic conditions, it must be reduced. Halisteresis and Volkmann's perforating canal absorption are already present. Osteoclast absorption must not aid them, otherwise root absorption will follow.

The patient should be prepared for these operations as the surgeon prepares a patient for a surgical operation. The indications are the same and the same methods must be adopted. Inflammation must be reduced as well as the causes which produce it.

In connection with pathology of the alveolar process and teeth, the article would not be complete without referring to the elongation of teeth. The removal of teeth from one jaw causes those on the opposite to elongate from want of antagonism. One or all of the six anterior teeth, upper and lower, are liable to lengthen. A low form of inflammation is set up in the alveolar process. If mild it causes the odontoblasts to build up bone cells and produce hypertrophy of bone and elongation of the alveolar process. If the inflammation be more severe halisteresis, Volkmann's absorption and the osteoclasts destroy the alveolar process, and elongation and loosening of the teeth result.

REMOVAL OF IMPACTED THIRD MOLARS—REPLY TO DR. KELLS.

BY M. H. CRYER, M.D., D.D.S., PHILADELPHIA.

The DENTAL DIGEST for January, 1904, prints a paper upon "Removal of Impacted Third Molars," which was read by C. Edmund Kells, D.D.S., before the National Dental Association at Asheville last year.

In this paper as printed I am made to pose as the author or abettor of doctrines which I never taught. Published statements of mine are misquoted and perverted, evidently for the purpose of setting up a straw man, upon which Dr. Kells then proceeds to exercise his rapier in his usual debonair and graceful style. There appears to be a studied attempt to show—first, that I am opposed to, or ignore the use of the X-Ray in diagnosing impacted third molars, and second, that I advocate the general extraction of the second molar in such cases. I deny that any fair reading of what I have said upon the subject will justify either conclusion.

Dr. Kells quotes me from the American Text-Book of Operative

Dentistry, second edition, page 610, as follows: "If trouble existed in this region the explorations would have to be made with sharp steel probes. The bone would then have to be cut away until the tooth could be grasped with the forceps." Upon this he comments: "This was written in 1900. In April, 1903, *International Dental Journal,* page 289, in discussing this subject Dr. Cryer once more reiterates his opinion of the value of steel probes in such cases in the following words: 'I have been unfortunate so far in having some of our best X-Ray men take skiagraphs for me. To-day if I had a case of impacted tooth I would depend upon a good sharp excavator rather than upon the X-Ray.'" His comment upon this later statement is: "This is certainly a most remarkable statement coming from such an authority. If the author were unknown it should be dismissed without comment, as it discloses a remarkable lack of knowledge upon the value of the Roentgen Ray," etc.

All this and more anent a very poor reproduction of the illustration here annexed, but so greatly reduced that the exhibit for which the specimen was originally prepared, namely, the density of the bone in abnormal conditions, was entirely lost. Dr. Kells makes this exasperating reproduction the first picture in his paper, and goes on to speak of the condition shown: "Referring to Fig. 1, which illustration (taken by permission from the American Text-Book of Dentistry) shows the right half of the lower maxilla, the outer plate having been removed to allow the impacted third molar to be seen, I would call your attention particularly to the dense character of the structure above the tooth in question, and it is through such dense bone as this that we are instructed to 'probe with sharp steel points and thereby get the location and character of the tooth.' Who is there in this audience that upon the supposition, mind you, supposition only, that there was such an impacted tooth located deeply in that jaw could have satisfactorily 'located' it by 'sharp steel points' and removed it in a creditable manner? I have no hesitation in acknowledging that such (*sic*) would have been entirely beyond my ability."

There was no occasion for Dr. Kells to lash himself into so fine a fury over this unfortunate specimen and the means of diagnosing the trouble of the subject. The man was dead before ever the specimen came into my hands, and there was no need of a diagnosis. As a matter of fact, even then the impacted molar was unsuspected.

There was nothing to indicate its presence except its absence from the dental arch and the condition of the second molar. The external plate along with a portion of the cancellated tissue was being removed to show the condition of the cancellated structure, which was suspected to be solidified, as it was found to be and as is shown in the picture herewith, when the saw struck the impacted tooth, and so "diagnosed" its presence. It could have been diagnosed with a sharp excavator through a thin porous area in the bone over the alveolar process between the external and internal plates just back of the second molar.

Now, I have never opposed the use of the X-ray as an aid to diagnosis in these cases. What I have said I repeat here, that I have

greater faith in the work of a sharp-pointed excavator or steel probe in defining the exact location of an impacted tooth. My reason for this preference is that men who are making special work of skiagraphing the jaws and teeth have failed so far to show me at least wherein it is more convincing in the practical surgical diagnosis of impacted teeth than a good sharp excavator, but I employ the X-ray in every case in which I think it would be helpful.

It must be borne in mind that the diagnosis of impacted teeth involves two factors: first, the recognition of the fact that an impacted tooth exists, and, second, the determination of its exact position and relations. The second factor must be made out clearly in all its details, for the first is of little or no practical use as a guide in the

surgical treatment or removal of the tooth, no matter how scientifically interesting it may be as an abstract fact.

At present the radiograph in my opinion is inadequate to supply the kind of data needed for the surgical treatment of cases of tooth impaction. I therefore depend upon the steel point and educated touch as the most reliable means for obtaining the needful information.

Skiagraphy has been of the greatest service in general surgery in locating *foreign* substances in various parts of the body, which in many cases could not have been readily located and removed without its assistance. A hospital can hardly be reckoned well-equipped in these days which is not prepared for this work. I hope that it will be so perfected that every dental college will have a complete outfit and teach its operation, but the time is not yet here when it can be depended on absolutely in the diagnosis of the position of impacted teeth. In most other parts of the body right-angle skiagraphs can be made, so that where both show the object its location is sure. This is not the case with the impacted tooth, the position of which may make it difficult to get a good picture of the tooth and its roots with their relations to the surrounding structures clearly defined. The cortical bone and the cancellated structure often are very dense, from the same cause which produced the impaction, namely, malnutrition. Sometimes only a faint shadow of the tooth shows, and even when a good shadow is obtained it is difficult to judge of the depth of the tooth, and a corroborative right-angle picture cannot be had. When these difficulties are overcome, as they doubtless will be, the special skiagraphy of the jaws will be of very great importance, and we will almost wonder how we ever got along without its help.

While in Europe last summer I saw some beautiful stereoscopic X-ray pictures of the head and face, which seemed a long step toward the desired perfection of the work for diagnosing the position of impacted teeth.

That I early appreciated the value of the X-Ray in diagnosing obscure lesions of the jaw is evidenced by this statement which I wrote in 1896, and which appears in the American Text-Book of Operative Dentistry, first edition, published in 1897, page 475: "The diagnosis of unerupted teeth occupying abnormal positions has been greatly facilitated by special application of the newly discovered

skiagraphic method." Since that time I have used the skiagraph in every case in which I thought it would assist the diagnosis, but I do not as yet accept it as the best and only means.

The second indictment which Dr. Kells brings against me charges that I advocate or favor the general extraction of the second molar as a means of relief when the third molar is impacted. As evidence he presents the following alleged quotation from the same chapter in the American Text-Book of Operative Dentistry which has before been referred to: "An impacted third molar causes great distress by initiating an inflammation which extends to the region surrounding the angle of the jaw and often including the temporo-maxillary articulation and soft parts within the mouth. Under these conditions the jaws can be only partly opened, deglutition is impaired, and solid food cannot be taken. One of two things must be done—either the offending tooth or the one in front of it must be extracted."

This misquotation contains one important error. It further misstates my position, in that it omits the qualifying context. The important error is the omission from the first sentence of the word "often" as printed in the book. The statement in the book is, "An impacted third molar *often* causes," etc., which I submit is an entirely different proposition from that which Dr. Kells attributes to me. The omission of the word would make me say that an impacted third molar necessarily causes great distress, etc., which is a gross misrepresentation of what I did say. However, the most vital misstatement of my position was the suppression of the sentence which in the original follows the garbled quotation—"Every effort should be used to extract the third molar." Some men are so constituted that no matter how honest they intend to be they can see no value in any evidence which does not bolster up their preconceived views. It is charitable under the circumstances to suggest that Dr. Kells may be so constituted. Had he completed the quotation with the qualifying context he would have had no basis upon which to set up the charge that I advocated the general extraction of the second molar.

That was my position in 1900; it is my position now—extract the third molar if possible; if not, and the patient must have relief, in the name of mercy sacrifice the second to get at it. Unnecessary extraction of the second molar verges close upon criminality. In all my experience I have had but one case of impacted third molar in

which this extreme measure—extraction of the second molar—was necessary.

In a *living* case like that of the specimen illustrated I should consider it good surgery to extract the second molar in the hope that the third would move forward so that it could be removed without further damage to the jaw. The bone in this specimen is very thin on the lingual surface of the tooth and also below it, and would easily fracture. It is so thin that the specimen has been broken in handling. Knowing this, and because I have seen numerous fractures from the extraction of the lower third molar, I have become very cautious in such cases. Thus far I have been fortunate in not having fractured a jaw, but I have seen cases of jaws that have been fractured by careful and competent surgeons in removing impacted teeth.

Commenting on this misquoted paragraph Dr. Kells says: "This statement I am not prepared to deny, though as before stated, while during my practice I have seen numerous impacted molars, I have not met with such a case as described. * * * It would therefore seem that such cases must be rare. In fact, I will go a step further and say they should be rare. I am sure an impacted third molar could not usually produce the conditions described by Dr. Cryer, in a young patient. They must be caused by pressure due to time. Now the point I wish to make is this—an impacted third molar should be diagnosed by skiagraphy in its early eruptive stage, and once correctly diagnosed as such should be removed without delay. The early removal of such teeth has always been my practice, and doubtless it is due to this precaution that I have not yet seen the serious conditions described by Dr. Cryer, and which would result in the loss of the second molar."

Quite likely he has never seen such a case; there are many dentists who have not, but that is no evidence that they do not exist. I never said they "usually produce the conditions described," but I did say they "often cause great distress." Again, I was not writing about "young patients."

Dr. Kells evidently bases the views which he presents upon the cases of impacted third molars which have occurred in his own practice, for he says: "The models to be exhibited of teeth extracted are all of comparatively young people and most of them young girls."

Under such circumstances, where one has had the supervision of the patients from earliest years, the course which he recommends is

doubtless practicable, but the cases of impacted third molars upon which my deductions were based were not confined to young girls nor were they mostly of my own patients. They included both sexes and all ages and they come from all sections. As a rule I have never seen them until they came to me for relief. During the past three months I have had some thirty-odd cases of impacted teeth referred to me, either for consultation, liberation, or extraction, the ages of the patients ranging from fifteen to seventy-eight years, the great majority being of adult age. I submit that the early skiagraph and extraction would have been impossible—for me—in the most of these. I submit also that not all the cases of impaction are discovered or even discoverable under ordinary circumstances in early life. To carry out Dr. Kells' idea we should have to subject all our patients to the skiagrapher, which would be about as absurd as testing the blood of every healthy individual with the Widal reaction for typhoid fever. Even then some of the guilty—among those who do not go to the dentist—would be likely to escape.

RELATION OF DENTAL AFFECTIONS TO DISEASES OF THE EYE.

BY L. WEBSTER FOX, A. M., M. D., PHILADELPHIA. READ BEFORE THE PENNSYLVANIA STATE DENTAL SOCIETY, AT WILKESBARRE, JULY 7-9, 1903.

That a fixed relation exists between the teeth and the eyes through the fifth cranial or trigeminal nerve is well known, but in order to more thoroughly understand this relationship it is necessary to briefly review the anatomy and the distribution of this nerve. The fifth cranial nerve is the sensory nerve of the muscles of the face and the motor nerve of the muscles of mastication. It arises by two roots, one of which is sensory and takes its origin from the side of the pons Varolii and from the nucleus near the margin of the fourth ventricle in the brain; the other, the motor root, originates in a nucleus on the floor of the fourth ventricle internal to that of the sensory root. These roots run forward between the bone and dura mater to the apex of the petrous portion of the temporal bone, where the fibers of the sensory root form the Gasserian ganglion. The motor root passes beneath it without being connected with it, joining one of its trunks outside the cranium. The Gasserian gang-

lion gives off three large branches—the ophthalmic, the superior maxillary, and the inferior maxillary nerves.

The ophthalmic is a sensory nerve and supplies the eyeball, lacrimal gland, mucous membrane of the eye and nasal fossæ, and the integument of the eyebrow, forehead, and nose. It joins with filaments from the cavernous plexus of the sympathetic, the third, the sixth, and sometimes the fourth cranial nerve. It divides into three branches; the lacrimal, frontal, and nasal. The nasal branch further subdivides into ganglionic, ciliary, and infratrochlear filaments. The ganglion branch passes forward between the two heads of the external rectus on the outer side of the optic nerve, joining a branch from the third or oculomotor nerve and filaments from the cavernous plexus of the sympathetic to those from the ophthalmic ganglion. Its branches of distribution are about ten short ciliary nerves which supply the ciliary muscle, iris, and cornea. The ciliary branches of the nasal branch are the long ciliary nerves and are also distributed to the iris, ciliary body, and cornea, joining the short ciliary nerves.

Thus far the fifth nerve is distributed to the various important structures of the eye. The dental innervation depends upon the various filaments of the two remaining branches, the superior and inferior maxillary nerves. The superior maxillary nerve commences at the middle of the Gasserian ganglion and passes forward through the foramen rotundum, crosses the spheno-maxillary fossa, enters the orbit through the spheno-maxillary fissure, traverses the infraorbital canal in the floor of the orbit, and appears upon the face at the infraorbital foramen. Its branches of distribution are meningeal, orbital, spheno-palatine, posterior superior dental, middle superior dental, anterior superior dental, palpebral, nasal, and labial. The inferior maxillary nerve is made up of two roots, a sensory root from the Gasserian ganglion, and a motor root which passes beneath the ganglion and unites with the sensory root just after its exit from the foramen ovale. It divides into an anterior and posterior trunk. The anterior trunk gives off the following branches—masseteric, temporal, buccal, and external pterygoid nerves, and the posterior trunk subdivides into the auriculo-temporal, lingual, and inferior dental nerves. Three ganglia are found along the course of the superior and inferior maxillary nerves, namely, the spheno-palatine, otic, and submaxillary ganglia, but as

they have no bearing upon the subject under discussion their description will be omitted.

From the description of the fifth nerve just given it will be readily seen that affections situated at the termination of any of its branches may be readily referred to the terminal filaments of other branches or widely diffused over the entire nerve. Trophic disturbances of the nerve are also likely to be attended by trophic alterations in the eyes or teeth or other structures to which the nerve is distributed. Disorders of nutrition of the body in general are also manifested through the fifth nerve by changes in the eyes and teeth. As examples of which may be mentioned the association of Hutchinson's teeth with syphilitic interstitial keratitis, and the rachitic teeth with various corneal conditions. Hypersensitiveness, pain, and intense neuralgia of the fifth nerve may be due to pathologic changes in the cornea, iris, or ciliary body in the eye or to some diseased condition of the teeth.

This relationship between the teeth and the eyes through the medium of the fifth nerve has been the subject of discussion for a number of years. H. Powers (*Trans. Odont. Soc. Gr. Brit.*, London, 1883-4, XVI, page 56) studied this subject in detail and found that dental lesions were very frequently the cause of diseases of the eye. He called attention to the necessity of carefully examining the teeth in threatening glaucoma, especially when associated with ciliary neurosis and with obscure temporal and orbital pain, mydriasis, myosis, sudden paralysis of some of the orbital muscles and loss of sensation in the absence of cerebral symptoms, phlyctenulæ and corneal ulcers (especially in children), sudden failure of accommodation, and exophthalmos. According to his deductions the irritation produced by the diseased teeth may affect the eye by—*inhibition, trophic or vasomotor influence, extension of neuritis, and reflex irritation or sympathy.*

G. T. Stevens (*Intern. Dent. Jour.*, XII, pages 145-147) also contributes to our knowledge upon this subject. He states that spasm of accommodation is not infrequent as a result of carious teeth. His extensive work in anomalies in the extraocular muscles leads him to believe that disturbances of these muscles are liable to prevent the proper development of the teeth by the neurasthenic phenomena they induce. He states that the deformity known as wedge-shaped jaw progresses as does myopia in many cases, and that in

his experience it is always associated with disturbances of the equilibrium of the extraocular muscles. Stevens observed in 1877 (*Medical Record*) a case of obstinate trifacial neuralgia referable to the teeth in one of his patients which was relieved by the wearing of proper correcting lenses. This patient was highly astigmatic and much credit is due Dr. Stevens, as the association of pain in the head with astigmatism had been demonstrated but two or three years before by Dr. S. Weir Mitchell. He also stated at this time that he himself suffered most agonizing neuralgic pain and had a tooth removed by his dentist but with no relief. He then discovered that the pain was associated directly with an excessive amount of eye-work, and it disappeared completely as soon as his ocular work was lessened.

Galezowski's (*Revue Generale d' Opth.*, Oct., 1888) observations at this period are also very interesting. He states that during the first dentition many rebellious cases of corneal disease arise from the reflex irritation induced by the difficult eruption of the teeth. He also believes that neuralgic affections about the orbit often arise from second dentition. Dental caries is often manifested by accommodative asthenopia, particularly in the absence of refraction errors. He also relates a case of unilateral blindness without any visible fundal lesion which he thinks arose from the extraction of a tooth. Brubaker (*Litch, A System of American Dentistry*) relates a case of amaurosis of twelve years' duration which was cured within a few days after the extraction of a diseased tooth, and a somewhat similar case in a woman thirty-four years of age was reported by W. W. Allport of Chicago (*Jour. Amer. Med. Assn.*, 1883, page 637). Dewitt (*Amer. Jour. N. S.* CX, 1868, April, page 382) described a case of unilateral blindness that was due to the same cause and was relieved by attention to the teeth.

Less common than the preceding are the affections of the iris, choroid, and lens that have been attributed to diseased teeth. H. Sevill (*Lancet*, 1884, page 709) in a paper read before the Harveian Society of London reported a case in which spasm of the muscles of the face and cataract followed dental irritation in a middle-aged lady who suffered greatly from neuralgia. Extraction of the diseased teeth in this case caused a cessation of the neuralgia and facial spasm, but the lenticular opacity persisted but did not progress. Mr. Juler reported before the same society a case of recent choroid-

itis near the posterior pole of the eye in a girl seventeen years of age, in whom removal of a carious tooth on the left side of the upper jaw resulted in a marked improvement in vision. He stated that he had also observed cyclitis and vitreous opacities in another case which could be directly traced to diseased teeth. In another case under his care the patient complained of persistent jactitation of the right eyelid, which was controlled by pressure opposite the infraorbital foramen. The removal of a carious tooth upon the same side resulted in permanent relief. Lander Brinton (*Dent. Misc.*, 1880, page 241) described a somewhat similar case in which twitching of the eyelid occurred after extraction of a diseased root and lasted until the wound healed.

Conjunctivitis has been attributed to diseases of the teeth by Förster, Kempton and others, and relief has been induced by extraction of the offending teeth. Iritis with external inflammation of the eye of fifteen days' duration coexisting with intense dental neuralgia of the same side has been cited by Galezowski (*Jour. d' Opth. Tome I*). That affections of the eye may affect the teeth is further shown by J. Hutchinson (*London Med. Mirror,* 1869) in the case reported by him in which acute ulcers of the cornea from injury with hypopyon, chemosis, and pain caused the patient to complain that his eyes made his teeth and ears ache.

Disturbance of the extraocular muscles by dental disease is also a well-known clinical fact. Hancock (*Lancet,* 1859) described a case of divergent strabismus and ptosis, and Ely (*Med. Record,* 1882) reported three cases of ocular palsy in which diseased teeth were the cause, removal of which resulted in cure. Spasm of the eyelid from a similar cause was reported by S. J. Hutchinson (*Med. and Surg. Reporter,* 1885).

The effect upon accommodation of diseased teeth has been casually mentioned, but of more value are the results of Herman Schmidt's (*Archiv. für Ophthal.*, XIV) examinations of ninety-two persons with dental affections. He found that in seventy-three the accommodative effort was markedly deficient.

Purulent inflammation at the roots of teeth is occasionally the cause of serious affections of the orbit, and the possibility of its occurrence should never be overlooked. In a case recorded by Simon Snell (*Opth. Review,* 1890, page 193) a sinus was formed in the left orbit which was directly associated with disease of the

right upper central incisor in a girl seventeen years of age. The dental condition followed an injury received five years previous. S. M. Burnett (*Arch. Ophth.*, N. Y., 1885, pages 177-180) adds to the literature on this subject the report of a case of great swelling of the eyelids and face following an unsuccessful attempt to extract the upper cuspid tooth on the left side. As a result purulent infection occurred, with abscess of the orbit, atrophy of the optic disk, obliteration of the retinal blood-vessels, and total blindness four months later.

Discussion upon the interesting relationship between the eyes and the teeth would be incomplete without reference to the so-called neuroparalytic ulcers of the cornea due to palsy of the trifacial nerve. In these cases there is always a possibility of some dental infection being the cause or a sequel of the nerve condition. Of equal interest is the peculiar trifacial neuralgia associated with sympathetic ophthalmia, irido-cyclitis, and acute glaucoma. In such cases the pain may be attributed to some dental affection by the casual observer and be attended by serious consequences. All cases of obscure trifacial neuralgia therefore necessitate careful examination of the structures, such as the eyes and teeth, to which its filaments are distributed.

Intractable ulcers in children are nearly always associated with dental caries, and my experience has been that unless the teeth are properly attended to it is useless to continue local remedies to the eyes. It is my invariable rule to have all hospital cases of this character referred to the dental department for an examination of their teeth.

Conclusions. 1. By reason of the trophic as well as the sensory filaments distributed to the eyes and teeth through the medium of the fifth or trifacial nerve the structures are often the subjects of nutritional disorders secondary to general nutritional disturbances of the entire economy. This is exemplified by the association of Hutchinson's teeth and rachitic teeth with syphilitic and other forms of corneal inflammation.

2. Structural changes at the dental extremities of the fifth nerve may induce alterations in the nutrition of the ocular structures by dispersing the innervation of that nerve as pain in twitchings.

3. Pathologic changes in either of the eyes may be secondary to

affections of the teeth, or vice versa as the result of extension of inflammation along the nerve or reflexly.

4. Trigeminal or trifacial neuralgia in a given case may be due to ocular conditions such as previously mentioned, or dental diseases, or both.

5. In all cases in which pain along the fifth nerve is apparently referred to the teeth, but fails to be relieved by appropriate treatment of those structures, a thorough examination of the eyes should be made. On the other hand, diseases of the eye, particularly when attended by similar pains that do not yield to treatment, necessitate attention to the teeth, as when diseased they retard the recovery, even if not directly causal.

6. In ocular affections complicated by disease of the teeth the dental surgeon should not be misled by the occurrence of trifacial neuralgia and attribute it to the dental condition. This is a serious error, as such neuralgia is an almost constant accompaniment of serious conditions, such as irido-cyclitis, glaucoma, etc., and demands the care of a skilled ophthalmologist.

Discussion. *Dr. C. V. Kratzer,* Reading: We all remember the admirable paper on "Gold Blindness" which Dr. Fox read before this Society a few years ago (DENTAL DIGEST, April, 1901, page 266), and the valuable hints given therein respecting the care of our eyes and general health. We should all be aware of the intimate nervous relation between the teeth and eyes, and know that there may be pathological reflexes from one to the other, and in cases where we are unable to find any local cause for dental disturbance, especially where there is a suspicion of eye trouble, this knowledge should prompt us to refer such patients to an opthalmologist.

Dr. N. H. Myers: A patient came to my office and complained of intense pain in a tooth which was also very sensitive. After an examination I suggested extracting it, but she would not consent to this and went to another dentist who devitalized the pulp. Inflammation set in and the pain became more intense, spreading to the ear and finally causing her to become deaf. She then came back to me, and believing that the trouble was still in the tooth I extracted it. Two days later the pain had entirely disappeared and her hearing had returned.

Dr. James Truman, Philadelphia: The intimate relation between the eye and ear must be understood before a scientific and correct

diagnosis of a pathological condition can be reached. We are fully aware of the fact that diseases of the teeth produce facial neuralgia. This is demonstrated in infancy but becomes more pronounced in later years, for as the second molar comes down from the ramus it produces reflex disturbances about the ninth year of age. We are all familiar with the troubles resulting from impaction of the third molar. If we cannot locate the cause of trouble in these reflex disturbances it is our duty to pass the patient over to the ophthalmologist. We must have reciprocity of science and medicine if we wish to practice dentistry properly.

Dr. W. F. Litch, Philadelphia: That there is an intimate nervous relation between the eyes and the teeth has long been recognized in a general way, but the fact has too often been lost sight of in the diagnosis of obscure cases. Dr. Fox's paper cannot fail to receive wide recognition as a valuable contribution to the literature of the subject.

Dr. C. S. Beck, Wilkesbarre: A woman, forty years old, had been suffering severe pain in her head and face for some time. She went to an oculist who tested her eyes, treated them, and did all that an oculist could do for a patient, until both of them became weary of trying without obtaining results. He finally suggested that there might be something the matter with her mouth, but she thought this absurd, as all of her teeth had been extracted and she was wearing a full upper denture. She came to me, however, and on examination I discovered a slight elevation in the mesial line above the ridge. I probed only a little way beneath the surface and struck something which felt like enamel. The patient insisted that all her teeth had been removed, but I put her under ether and extracted a tooth. She recovered at once and the pain disappeared entirely.

Dr. H. C. Register, Philadelphia: I have had several cases where the cause of disturbance has been obscure, but I wish to record one case especially where the pain was intense. The patient was a woman, fifty-five years old, and had been under the care of a physician and an ophthalmologist for a long time. She suffered intense pain in her eyes, extending to the region of the cerebellum, and had been kept in a dark room and under the influence of anodynes. Both of the men in attendance had done all they could, but the patient still suffered. The physician requested me to look at her mouth, and on examination I found that two of the bicuspids

responded abnormally to thermal influences while the others were normal. I drilled into the pulp chambers of these two teeth and found that the pulps were restricted to within a fourth of their length by a band of dentin which was maintaining constant pressure. I devitalized and removed the pulps, finding minute granules in their substance, and after this simple operation the patient became a well woman and the pain disappeared.

LEUCOPLACIA AND ITS RELATION TO CARCINOMA.

BY J. M. BARNES, D.D.S., ALBION, NEB. READ BEFORE THE NEBRASKA STATE DENTAL SOCIETY, AT LINCOLN, MAY 19-21, 1903.

Leucoplacia is from the Greek, and means—*leuko,* white; *plakis,* surface.

Synonyms.—The disease is variously known as leucoplacia, psoriasis linguæ, zona, smoker's patch, ichthyosis, leucokeratosis, leucoplasia, superficial glossitis, leucoplagus and perosis mucosæ oris.

Definition.—A disease of the mucous membrane of the buccal cavity, in the form of a chronic superficial inflammation affecting the tongue, palate, cheeks and gums; characterized by one or more rounded or irregularly shaped or diffused, pearly-white or bluish-white plaques or patches, in some cases small, in others covering the dorsum of the tongue, the cheeks from the angle of the mouth backward sometimes as far as the fauces, and the palate or entire buccal surface of the gums. The terms "leucoplacia buccalis," "leucoplacia linguæ" and "leucoplacia gingivæ" have been applied to the various forms to designate the location of the disease.

Varieties.—Two forms of leucoplacia are found in the human mouth—the milky, opaline patches or "plaques opalinus" represented by the mucous patches of the second stage of syphilis, and the non-syphilitic, smooth, pearly-white patches which were termed "leucoplacia" by Schwimmer and "leucoma" by Hutchinson. A warty variety has been described by Hulke and termed ichthyosis linguæ.

The plaques opalinus or the mucous patches of secondary syphilis are grayish white and curdy in appearance, resembling the corrosion by the application of silver nitrate to mucous membrane. Elevation of the patch, watery fluid, and a tendency to ulceration and pain are accompaniments.

Leucoplacia plaques are thin, shiny, pearly white or bluish white in color, sometimes with a yellowish tinge, but this may be due, in the opinion of Butlin, to the stain of tobacco or other extraneous substance. Patches are not elevated except in the watery form.

In ichthyosis there is no secretion; it is not painful except in the advanced stage, and does not ulcerate until the disease has taken on a malignant form.

To true leucoma or leucoplacia Marshall calls especial attention for the following reasons: 1. It is an exceedingly dangerous affection, often being a forerunner of carcinoma. 2. It is a disease which from its innocent appearance and the painless character of its earlier stages is seldom recognized until it has progressed to a stage which renders a favorable prognosis exceedingly doubtful. 3. The disease seems from personal observation to be on the increase. 4. The dental surgeon from the very nature of his specialty is in a position to see and recognize the disease in its earliest stages and to warn the patient of his condition before it has progressed so far as to prove a menace to life. In the earlier stages before this disease becomes troublesome it is much more likely to be noticed by the observing dentist, because of his opportunity to come in contact with it. Therefore he should be able to recognize the disease at a glance, and advise the patient of the necessity of consulting a surgeon or instituting a treatment to arrest the growth or for its complete removal.

Etiology.—The etiology of leucoplacia is as yet an unsettled question. Opinions still differ widely among the best pathologists. It was at first supposed to be some form of skin disease, like hives, by some writers. Others thought it to be a local manifestation of psoriasis. Many have considered it a chronic inflammation of the mucous membrane of the mouth due to syphilis, and still others contend that it is a distinct affection resulting from local inflammation caused by chewing and smoking tobacco, alcohols, peppers, caustics, and other irritants. However, most modern writers look upon leucoplacia as an entirely distinct affection, having no association with psoriasis in any of its forms. Hyde says: "Psoriasis is not known to affect the mucous surface. The lesions of so-called psoriasis linguæ are those of leucoplacia buccalis, of smoker's patches, of syphilitic disease of the mouth or of flat epithelioma."

Predisposing Causes.—Butlin and Debove agree that there is in most patients a predisposition to the disease. Debove says: "I sus-

pect that the mucous membrane of the tongue in leucomatous subjects is from the first less thick and stable, and more easily irritated than in the majority of persons. As some persons are known to have delicate skins, easily inflamed and prone to eruptions, and as some of those persons develop eruptions of the skin which are very chronic and difficult to heal, so I believe other people have tongues whose mucous membrane is abnormally delicate, prone to chronic inflammation and difficult to cure when disease has been excited." Rheumatic and gouty diatheses have been suggested as predisposing causes, but evidence seems insufficient to consider these as etiological factors. Age and sex are important predisposing causes. It is rarely seen in persons under twenty years of age, and rarely begins in persons over sixty years of age. Women seem to be almost entirely exempt. Dr. Marshall reports twelve cases. of which eleven were men.

Exciting Causes.—Irritation produced by the constant use of tobacco, both smoking and chewing, the habitual use of undiluted spirituous liquors, the eating of highly spiced foods and the drinking of hot fluids. The irritation produced by sharp and roughened carious teeth, or accumulations of salivary calculus and dentures which are rough and ill-fitting, irritating to the mucous membrane. Park is of the opinion that leucoplacia is due often to syphilis and says: "These late and recurring lesions (syphilitic mucous patches) lose their moist character and become quite smooth, shiny, of a bluish-white color, and mark a condition known as leucoceratosis."

Pathology.—Upon examination of the histologic structure of the leucomatous patches a marked change in the character of the papillary layer of the tongue, the mucous membrane of the lips and the cheeks, and the cells of the epidermis will be noticed. There is found keratosis with marked thickening of the superficial layers, thickening of the deeper strata and down-growth of the epithelial processes. The papillæ of the tongue may be very much atrophied, and in places almost entirely obliterated, and the subepithelial tissue showing inflammatory changes and infiltration of round cells. The epidermal layer has taken on a horny character more like that of the skin. This is true also of the epidermal layer in leucoplacia of the mucous membrane of the lips and cheeks. Finally, sclerotic changes may take place in the submucous and deeper layers.

In the advanced stages of the disease true cell nests are found,

which establishes the fact of carcinomatous degeneration. The question is still disputed as to the manner in which the cell nests are formed, but in carcinoma of the tongue and oral mucous membrane following leucoplacia it would seem probable that the cell nests were developed from traumatic inclusions of epithelial cells following the repeated ulceration and healing of the leucomatous patches.

Fordyce's examinations in cases of epitheliomatous development showed the new growth to belong to the tubular epithelioma, with but little if any disposition to the formation of horny tissue.

Herdingsfeld in a case of long duration, showing apparently no degenerative changes, found the leucoplacia condition to be distinctly preepitheliomatous in character—marked proliferation and downgrowth of the epidermis and areas of degeneration with a nest-like arrangement of the epithelium; a good wall of connective tissue separated it from underlying structures.

Symptoms and Diagnosis.—The first sign of a leucoplacia patch is a slightly increased redness, sometimes with a bluish tinge, often requiring close inspection to recognize its presence. In this stage there may be sensitiveness to hot and acid foods. This stage may last weeks or even months and frequently is unobserved, the first sign recognized being the white or opaline spot into which it evolves. This consists of a rounded or irregular, circumscribed or diffuse, smooth-white or pearly-white patch. These patches appear in varying numbers from one to several upon the mucous membrane of the tongue, palate, cheeks, gums or lips, and often coalesce to form larger ones.

In their early stage they are not elevated from the surrounding tissue and appear as smooth glistening patches, and range in size from tiny, irregularly outlined spots to large plaques the size of a silver half-dollar or larger. They are usually not sensitive at first, and for this reason may exist for some time without knowledge by the patient. Many cases never progress beyond this stage, while others may increase slowly in size and density of color, the plaques being slightly raised, the surface hard, cornified and roughened. With this stage, especially when the disease is located upon the dorsum of the tongue, the patient will complain of persistent dryness of parts and inability to use the tongue with comfort except by frequent moistening.

It is not unusual to find the affected surface as well as the other

parts of the tongue traversed to a variable degree by superficial or deep transverse and longitudinal grooves. These are the so-called smoker's patches, although this term is likewise applied to the more advanced types also. Later fissures appear in the tongue and there is developed a smarting, burning sensation as though the parts had been scalded. These sensations are increased by alcoholic liquors, fermented beverages, acid fruits, highly seasoned or very hot food or drinks, chewing and smoking tobacco, which may render the partaking of food a great discomfort.

With this condition some portion of the plaque may peel off or slough out from time to time, leaving a reddened or raw surface which is very sensitive. This may be followed by ulceration and degenerative changes, developing in the formation of a carcinoma. When the disease occurs on the tongue warty growths may appear in the plaques, which show a decided tendency to take on a rapid form of carcinomatous degeneration.

The region most commonly the seat of leucoplacia is the tongue, especially on its dorsal surface anteriorly and laterally, but it may occur on any or all sections of this organ and involve a portion or the greater part of it. The inside of the cheek is another favorite but less frequent situation, and the inner aspect of the lips may be its site.

Differential Diagnosis.—Leucoplacia may be confused with the mucous plaques of secondary syphilis and epithelioma. In the early stages this mistake is not likely, as there is in the mucous patch no tendency to epithelial hardening, but on the contrary it is usually soft, with the surface film generally easily removed, and a disposition to superficial abrasion, and not infrequently to more or less ulcerative action. The mucous patch forms rapidly and is usually of short duration, and other symptoms of syphilis are likely to be found. A course of treatment with iodid of mercury or iodid of potassium will clear up the diagnosis of syphilis, and in epithelioma the microscope would be necessary for a positive diagnosis.

Prognosis.—This depends upon the predisposition or tendency of the disease to take on malignant degenerative changes, as there is not the least doubt that such a predisposition exists.

Senn, in speaking of carcinoma of the mouth, says: "Carcinoma of the mucous membrane of the cheek is sometimes preceded by a patch of leucoplacia. The influence of chronic irritation in produc-

ing carcinoma is well shown in carcinoma in this locality, as the tumor very often corresponds in location with the crowns of prominent upper and lower molar teeth."

In the "American Text-Book of Surgery" we find this statement: "Many cases of cancer of the tongue are preceded by leucoma, the so-called psoriasis of the tongue."

Sutton says: "In a fair proportion of cases (20 per cent) epithelioma of the tongue is preceded by changes known as leucoplacia and ichthyosis, and they are frequently referred to as precancerous conditions. In case of the cheek epithelioma is sometimes preceded by a patch of leucoplacia. The disease often starts close to the angle of the mouth and extends backward into the cheek, or it begins in the fold of the mucous membrane between the gum and the cheek, and occasionally it starts in the center of the cheek, often on a level with the meeting-place of the crowns of the upper and lower molar teeth."

Butlin states that out of eighty cases of cancer of the tongue sixteen were preceded by leucoma.

Treatment.—When well developed leucoplacia is usually very rebellious to treatment, and sometimes shows a tendency to carcinomatous degeneration, therefore the measures employed would be palliation and heroic operations. Cases giving a clear history of syphilitic infection may be benefited by a course of anti-syphilitic treatment, but up to the present no drug has been discovered which, acting constitutionally, has any beneficial effect upon the progress of leucoplacia. Preventive measures which may be instituted are the removal of all forms of irritation, both chronic and mechanical. Patients should avoid any form of alcohol, acids, highly spiced and very hot foods or drinks, and tobacco, both chewing and smoking, as these stimulate the progress of the disease.

The mechanical irritants common in the mouth are usually associated with the teeth or with artificial dentures, as carious cavities, jagged roots, salivary calculus, fractured teeth, or rough or ill-fitting plates. These irritations should be corrected by filling the cavities, extracting the roots, treatment of the fractured teeth, removing the calculus and polishing the surfaces of the teeth, and the irritating artificial dentures should be removed altogether or be replaced by dentures free from these objections.

Local Treatment.—Nicholson recommends a trial of tinct. ferri

perchlorid, 25—30 minims, applied to the patch three times a day, as it seems to give relief from the burning pain and improve the epithelium.

Rosenberger recommends the local application of pure balsam of Peru, painted upon the patches with a brush, allowing it to remain in contact three to five minutes. He advises this to be applied 3 t. i. d. Vidal used a 20 per cent solution of chemically pure chromic acid applied to the patches. Glycerite of tannin every day or two may be beneficial. Rosenberger uses a 20 per cent solution of iodid of potassium painted on the plaques.

Palliative Treatment.—This is the use of alkaline mouth washes. Butlin recommends potassium bicarbonate 15—20 grains in 1 ounce water in mild cases; or bicarbonate of soda or boric acid in severe cases. Glycothymoline and aqua calcis also make a good alkaline lotion.

Internal Treatment.—This consists in keeping the bowels open, and the use of general tonics when indicated.

Surgical Treatment.—When the disease assumes a malignant character radical operation is the only safe method, and thorough extirpation should be done at the earliest possible moment. Temporizing by the use of caustics in this stage is useless, for the reason that the irritation seems to stimulate the malignant degeneration. Butlin says: "One general rule holds good for all cases of leucoma—namely, not to use caustics. Whatever danger there may be of the development of carcinoma is certainly increased by the employment of nitrate of silver and other caustics."

Conclusions.—Leucoplacia, on account of the fact that it may terminate in malignant degeneration, is a dangerous affection. Being a disease of the oral mucous membrane it very often first comes under the observation of the dentist, who from the nature of his specialty should be able to recognize the disease and impress upon the patient the necessity of early institution of treatment tending to arrest further development of the affection. In presenting this subject it is not my purpose to bring out an original paper on "Leucoplacia," but to mention a disease which is of interest to us as dentists from the standpoint of diagnosis and in some cases treatment. Although the disease is not very frequently seen, still the fact that it does exist, and may terminate in a malignant growth, should be sufficient to make us give the subject some thought.

NARCOTILE AS A GENERAL ANESTHETIC.

BY F. A. WELD, D.D.S., BELVIDERE, ILL. READ BEFORE THE ILLINOIS STATE DENTAL SOCIETY, AT BLOOMINGTON, MAY 12-14, 1903.

In presenting this subject for your consideration I would not have you think that narcotile is the only anesthetic, but in cases where an anesthetic of this character is indicated its rapidity of assimilation and elimination, the fact that it is a constant and unchanging chemical product, its freedom from bad after-effects, and its adoption by some of the most noted surgeons in both this and foreign countries are sufficient reason for giving this subject our careful attention.

The discovery of narcotile as an anesthetic agent, like some other noted discoveries, was an accident. Ethyl chlorid, which has been in use many years, and some preparations of which can be traced to the early centuries, was being used to produce an entirely local effect, when the patient, probably owing to an abnormal susceptibility, passed into a state of complete anesthesia. Following this incident a more systematic study of the drug and methods of administrations was begun, and now the perfected product is known as "Narcotile," and various inhalers can be procured for aids in administration.

Narcotile or bichlorid of methyl ethylen is obtained by the direct reaction of hydrochloric acid on mixed ethylic and methylic alcohols distilled together and the vapors condensed under pressure and cold. It is highly volatile, rapidly assimilated by the respiratory organs, and quickly eliminated from the body. Its general effects are similar to those of sulphuric ether, but more rapid than chloroform or nitrous oxid.

Its action, so far as can be determined, is first on sensory nerves and spinal centers, second on motor centers and motor nerves, third on the medulla oblongata. From its action chiefly on the cerebrospinal centers and motor nerves we conclude that the heart is practically exempt from its effects. This statement is further emphasized by the fact that during complete anesthesia the action of the heart is noted to remain unchanged, except for a slight moderation such as would occur during natural sleep.

Nevertheless, it is well for the anesthetist to make an examination regarding cardiac troubles, also inquire as to alcoholic indulgence, then follow closely the general rules for anesthesia in regard to con-

stricting clothing, artificial dentures, recumbent position, etc., also bearing in mind that in cases of spinal diseases of whatsoever kind narcotile is contraindicated.

Owing to its rapidity of action the various stages of anesthesia are barely perceptible, though sometimes the patient will present no outward sign of being anesthetized, yet on arousing from the stupor will declare the operation painless. Cyanosis never occurs and rigidity is not at all prominent.

The apparatus for administration is very simple, consisting of a celluloid face-piece, which permits the operator to see if the patient is breathing properly, and on this is fastened an inflated rubber rim to insure perfect adaptability to the tissues. Two valves are also provided, one for inspiration and the other for expiration. The valve for inspiration is situated at the lower end of a tube, to the other end of which is fitted a hollow bulb containing cotton or wool. Against this the spray of narcotile is directed.

The amount required to produce anesthesia varies, and though some writers claim 15 or 20 c.c. should be used, I have never encountered a case requiring more than 10, and this was sufficient for an extended operation.

A few facts as stated by surgeons who have had an extended experience with this preparation will probably interest you. Dr. M. W. Ware, attending surgeon to the Good Samaritan Dispensary in New York, has given us several articles concerning this anesthetic. In one he describes giving it to a child for fifty minutes without any bad effects, and the number of his administrations averaged fifty per month in 1901.

In England we have a record of 12,000 cases without a reported accident or fatality. Dr. Mackie of Nottingham says, "Gas is unsatisfactory from the shortness of its anesthesia, as also from the tendency to struggle under its use. In no case have I had the slightest anxiety or seen one dangerous symptom. Alcoholic cases render administration rather expensive from the amount required."

Dr. G. F. Logan, who has written on this subject, quotes Dr. Wiessner, with a record of four thousand cases, as saying, "In from one-half to two minutes—according to the age of the patients or whether they have been accustomed to large doses of alcohol—the anesthesia is complete. I have had persons answer questions without having the slightest recollection on recovering consciousness of

the conversation they had taken part in. I have observed a period of excitement only in alcoholic patients and even then not generally in a high degree. Only in one case was anesthesia impossible on account of the excitement. Never did feebleness of the heart, falling back of the tongue, or difficult respiration, with its consequent asphyxia, present themselves."

In closing I will cite a few cases in my own experience, covering about forty administrations. One that was of particular interest to me was a lady of perhaps thirty-five, who informed me she could not take gas as it had been tried and failed. Chloroform was tried, but had to be abandoned on account of the heart. Shortly afterwards I became interested in narcotile, and after a few experimental administrations I persuaded the patient to try something new. She readily consented, and in the presence of two physicians she was anesthetized and the operation performed, no bad effects following. The heart pulsations remained constant, respiration natural, but there existed a slight muscular rigidity, probably due to reflex excitability and the fact that anesthesia was not pushed as far as it should have been.

Another case of a girl of eleven was followed by severe nausea. This seemed very puzzling, as her mother said she had not eaten for over three hours. Later developments disclosed the fact that the mother was not posted on recent events, and another case was recorded concerning the incompatibility of foods and anesthetics.

From the foregoing you will see that absolute success does not attend every administration. Dr. Ware places failure at five per cent, but with a careful study of conditions, a reasonable amount of patience, combined with the skill that comes from experience, this can be greatly reduced.

Discussion. *Dr. W. H. G. Logan,* Chicago: Narcotile is composed of methylic alcohol, which is produced by the distillation of hard wood. Its anesthetic property has been known for years. Ethylic alcohol also has anesthetic power. These two have been combined, and upon them an action has been brought about by bringing the mixture into contact with hydrochloric acid. Sulphuric ether is produced by the action of sulphuric acid upon ethyl alcohol. This leads us to the consideration as to how this ether produces anesthesia, and here I differ a little with the essayist. He says that this substance is quickly assimilated by the air passages and quickly

eliminated by the whole body. The assimilation of the vapor by the air passages will not produce anesthesia. With narcotile, ether, chloroform, nitrous oxid, etc., anesthesia is produced in the same way. The vapor is carried into the lungs, and then absorbed through the thin walls of the capillaries into the blood and carried throughout the entire system. The action is more through contact than through chemical change. We do not know just what organ eliminates most of the anesthetic. Now suppose that the patient is anesthetized and an accident occurs. If the mask should be kept on the face too long the blood would become too highly charged with the anesthetic, the nerve centers would be paralyzed, and death or syncope would ensue. When considering any anesthetic you must also bear in mind the question of collapse. It was maintained that this drug has no effect on the cardiac or respiratory centers, which would be an objection, if I correctly understand the essayist. Chloroform and ether act first as respiratory depressants and second as cardiac depressants in case of syncope, so the first thing to do is to administer a respiratory stimulant—one-fortieth grain of strychnin sulphate hypodermically—and if the patient does not recover immediately administer a cardiac stimulant. Draw the tongue forward, which will induce reflex action and start breathing, and at the same time strike the abdomen and irritate the diaphragm, and an inspiration of air will result. The patient is of course in a recumbent position, and having done the above things, administer from five to twelve minims of aromatic spirits of ammonia, which will bring him back to life.

Narcotile prolongs anesthesia more than does nitrous oxid, and the recovery is not only quicker than with ether or chloroform, but there is less danger than when these agents are employed. I believe that narcotile will take the place of nitrous oxid, at least in the practice of those who do extracting, and I take pleasure in commending it. As a rule dentists feel that they cannot give this because it is a general anesthetic. A dentist has as much right to administer a general anesthetic as a physician, providing he is thoroughly familiar with his agent and knows what to do in case of accident.

Dr. J. P. Buckley, Chicago: Dr. Logan made the statement that anesthesia is produced by contact when it gets into the circulation

and not by chemical action. I would ask if he considers this anesthetic in the blood an irritant.

Dr. Logan: Primarily it is an irritant to the alveolar sac in the lung, and for that reason you have postoperative pneumonia after anesthesia. It is an irritant to the system until its anesthetic properties have been produced, and then because of anesthesia it ceases to be an irritant.

Dr. F. H. Skinner, Chicago: In any short operation narcotile is certainly an ideal anesthetic—where two or three teeth must be removed or a pulp that is almost exposed extracted—work that can be done in a minute or less. In the preparation of cavities where there is sensitive dentin, necessitating prolonged anesthesia, it does not seem to be indicated, unless the method of giving it be changed. The short action of gas has been spoken of. Gas given and not continued has a briefer action than narcotile, but gas mixed with air or oxygen by means of the Hurd inhaler does not produce cyanosis and the anesthesia can be prolonged indefinitely. Take the case of a mouth full of roots that you want to extract, and use one of the old style inhalers or the narcotile as demonstrated to-day—if the patient begins to wake up in the middle of the work you would feel rather loath to replace the inhaler in a mouth full of blood, although I should feel safe in using the gas. Whenever I foresee hemorrhage I roll up several good-sized balls of cotton, and after the patient is anesthetized I draw the tongue forward and place one in the back part of the mouth. This holds the tongue forward, compels breathing through the nose, keeps the air passages clear, and there is no danger that the blood or anything else will get into the throat. If the cotton becomes saturated with blood a fresh roll can be substituted.

Dr. Buckley: If Dr. Logan had limited his discussion to the paper he could not have said anything, but he saw fit to go beyond the bounds of the subject and I wish to answer some of his claims. I cannot comprehend how a man can say, and expect this audience to believe him, that an organic compound, the elements of which are as weakly combined as they are in chloroform, ether or narcotile, can be taken in through the air passages, go through the lung tissue into the blood current, and be carried by this to the centers of the brain, without undergoing decomposition or disassociation. Dr. Logan also said that this organic compound is com-

posed of methyl alcohol. I might say that common salt is composed of sodium, but sodium is only one of the radicals in the compound. The positive radical of methyl alcohol is one of the radicals that compose narcotile, but narcotile is not composed of wood alcohol. Ether is made by the action of sulphuric acid on ethyl alcohol, producing first ethyl sulphuric acid with water as a by-product, $C_2H_5OH+H_2SO_4=C_2H_5HSO_4+H_2O$. Add more alcohol to the ethyl sulphuric acid and we get ethyl oxid, $C_2H_5OH+C_2H_5HSO_4=(C_2H_5)_2O+H_2SO_4$. This radical of the ethyl alcohol combines with (ether)
the oxygen and the hydrogen comes back to recover the sulphuric acid. (Illustrating.) Here we have ethylic oxid, called sulphuric ether because sulphuric acid is used in its manufacture. The paper stated that narcotile is a bichlorid of methyl and ethyl alcohol, which means nothing. I wish the manufacturers would tell us what these products are and not give us a long name which signifies nothing. Such action simply exposes the ignorance of the manufacturer and insults the intelligence of the dental practitioner. So far as its action is concerned, it is unreasonable to assume that this compound, whatever it is, can be taken into the system and produce anesthesia simply by coming in contact with something, and that the radicals or ions of these compounds are not disassociated nor broken up. That they do not act upon the protoplasm of the cells is a very broad statement.

Dr. Logan: The statement that these vapors are carried into the blood and pass out of the system is not new with me. The standard article on this question, which I judge will stand for many years to come, was written by Dr. Lyman of Chicago, and I quote him word for word when I say that an anesthetic acts more by contact than by chemical change or decomposition.

Dr. Buckley: I shall endeavor to prepare an instrument with which we can collect and retain these anesthetics when they come out of the patient, because they are expensive and in that way they can be used over and over again.

Dr. T. L. Gilmer, Chicago: We have cause to congratulate ourselves that these young men are coming to the front and are producing such valuable papers and discussions. However, I think that dentists as a body, the younger men especially, are inclined to believe unqualifiedly in anything that is presented in an enthusiastic manner.

I do not wish to especially antagonize anything the essayist has said. It may be that all the claims made for this drug are true, but I doubt if this anesthetic is as safe as it is supposed to be. Twelve thousand safe administrations seem like a very large number, but in reality they are not enough to amount to much, and many times that number of administrations will be necessary before we can compare it with chloroform, ether or nitrous oxid. A number of years ago bromid of ethyl was being used widely and the profession was becoming enthusiastic over it. It was employed many times without a death, but suddenly we learned that it was killing people and was not so safe as popularly supposed. This new anesthetic may cause death sooner or later and when it is least expected. I would therefore urge its use but recommend caution. I have known of narcotile for some time, but have not used it in my work because only a few surgeons have taken it up.

Dr. Logan recommended strychnin when respiration failed, but I believe that the drug is more of a heart stimulant than a respiratory stimulant. It is a general stimulant and indirectly may stimulate the lungs, but we have other drugs that act more quickly and are superior as respiratory stimulants, namely, amyl nitrite or nitroglycerin. Instead of using cotton, as suggested by Dr. Skinner, I would recommend a large piece of gauze.

Dr. R. J. Cruise, Chicago: When in Europe last year I learned that the dental supply houses were enthusiastic over narcotile. I saw it administered by some dentists in their private practice, and owing to their apparent entirely satisfactory results I became interested in it and consulted with some medical men of note, asking their opinion in regard to it as a general anesthetic. Several of them told me that narcotile, which is nothing else than bichlorid of methyl ethylen, had been on the English and French markets for about thirty years, for use in both dentistry and medicine, and so far as they were able to discover the chemical preparation was exactly the same to-day as it was then. They stated that it was adopted with great enthusiasm by both professions and was used for some time without any bad effects, but suddenly there were several deaths and it was given up. We must now await the results of the revival of this anesthetic which is offered to us under the name of narcotile. So far there have been no unsatisfactory results reported,

but very likely we shall ere long have a repetition of the same bad effects which followed its appearance some thirty years ago.

Dr. Weld, closing discussion: There are several appliances on the market for giving narcotile which permit of its administration to any desired period, and the percentage of air and of narcotile can be regulated by the operator at will. I believe it is true that some accidents occurred years ago, but I should hope that our manufacturers and chemists have made some improvements in their methods and products during the last thirty years. This paper is not the result of my own clinical experience, and I am not an enthusiast in the use of narcotile, having employed it only since last November. I have merely followed the lead of some prominent men in the east, notably Dr. Capon of Toronto, who gave a clinic with narcotile in February before the Odontographic Society.

TECHNICAL MICROSCOPY—A SUMMARY.

BY DR. ELIZABETH C. FIELD, LINCOLN, NEB. READ BEFORE THE NEBRASKA STATE DENTAL SOCIETY, AT LINCOLN, MAY 19-21, 1903.

The old saying that one-half of the world does not know how the other half lives is perhaps true of its inhabitants, but man with his natural inventive genius has overcome many difficulties formerly called insurmountable. He has brought by means of the telescope the sun and stars within his grasp, so that he can study their conditions and component parts as well as we can determine the chemical composition of a common pebble found by the roadside. He has enabled us, by means of the microscope, to observe the manner in which the cells of our body grow, multiply and die. Truly by the aid of these instruments we are enabled to make out much of the divine plan.

The progress made in dentistry during the last quarter of a century, and the high degree of perfection reached in the manipulation and skill with which mechanical instruments are used, have been gratifying in the extreme. But with all the enlightenment we have it is nevertheless true that there is a continual and steady deterioration in the quality of teeth. Have we not perhaps gained mechanical skill to the detriment of the higher scientific prevention standard? Dentistry as a profession should lead to as proficient work in all of its branches as possible. Should we not all be investigators after the

true condition and the manner by which the present ravages can be thwarted? We throw aside the microscope and its adjuncts as soon as we leave the college. Would it not be better to continue in those researches which may in time lead us to the great truth?

The great progress of medical education in America during the past twenty years is marked chiefly by the increased attention given to the scientific branches which form the basis of all medical training and practice. In no respect is this progress more obvious than in the recognition of the value of the microscope as a medical instrument upon which in its manifold applications to anatomy, physiology, bacteriology, pathology, and sanitary science the advance of medicine depends to a far greater degree than upon any other instrument or apparatus. As dentistry properly is a subdivision of medicine, it does not seem inopportune to briefly give some of the details regarding the preservation and manipulation of specimens destined for such scientific work.

Few organs of the animal body are of a structure suitable for microscopic examination without special preparation. They must possess a certain degree of transparency, which is attained either by separating the organs into their elements or by cutting them into their sections; that is, either by isolating or by sectioning. Further, very few organs possess a consistency that without treatment allows of the cutting of sufficiently thin sections; they are either too soft (in which case they must be hardened) or too hard (in which case they must be decalcified). But fresh objects can be neither hardened nor decalcified without injury to their structure; both processes must be preceded by treatment which kills the structural elements very rapidly and at the same time preserves their natural form. This procedure is called fixing. Usually the preparation of thin sections is possible only after fixing and hardening, followed in some cases by decalcification of the object. The sections also require further treatment; they may be rendered transparent by means of a clearing media or they may be stained before being made transparent. The staining materials are invaluable adjuncts to microscopy.

In selecting the proper material, secure the specimen as fresh as possible, and it is advisable to place it while still warm in the fixing fluid. Many different fixing solutions are used, but one of the most practical is 95 per cent alcohol; even 90 per cent will almost always

shrivel the object. A 3 or 4 per cent solution of formaldehyde is also much used, but others, such as chromic acid, nitric acid, osmic acid, etc., have their especial adaptability to certain tissues. Except when alcohol is used all the fixing methods necessitate a supplementary process of hardening. The best hardening medium is alcohol in ascending degrees of strength. Here, as in all such work, the rule is to use an abundance of fluid and to change it if it becomes turbid or colored. The exact application is as follows: after the object has been fixed in one of the previously enumerated fluids and washed in water, it is placed under exclusion of daylight for twelve hours in 50 per cent alcohol, then transferred for the same period to 70 per cent alcohol, and at the expiration of this time to 90 per cent alcohol, in which the hardening is completed. In this alcohol the specimen may remain indefinitely before the final preparation.

When desiring to section the specimen a sharp razor should be used, and the blade moistened with alcohol—not water. If the object to be sectioned is too small to be held with the fingers it may be embedded by placing in a cleft made in a piece of hardened liver.

If the specimen is to be stained in bulk, one of the best nuclear stains is borax-carmine. The fixed and hardened objects are placed in the solution for twenty-four hours or more, then transferred to acid alcohol and mashed till the alcohol does not take the stain. The object is then transferred to 90 per cent alcohol and run up through absolute alcohol, when it is ready for cutting.

One of the most commonly used double stains is evasin and hematoxylin. Here the specimen is not used as a whole, but in sections. The evasin delineates the margins of the cells by giving them a reddish tinge, while the hematoxylin is particularly adapted for unclean work and gives a bluish color to those tissues susceptible to it.

Each section should now be examined without a cover-glass with a low-powered microscope in order to ascertain its usefulness. If it be good it is placed for from one to two minutes in a watch-glass containing absolute alcohol, then for the same length of time in oil of bergamot or oil of cedar. From this it is transferred to xyolo for a few seconds, and then placed back on the slide. The excess of xyolo may be removed with filter paper and the prepared speci-

men covered with Canada balsam diluted with xyolo; then cover with a proper cover-glass.

The results obtained by this method, if properly executed, will be admirable, and such as to allow of the deepest and most thorough scientific investigation.

By those who have become proficient with the razor, or have a microtome, fresh objects may be sectioned by freezing with ether. Place one drop of a 75 per cent salt solution in the slide and put the sectioned specimen in it. Place in the cover-glass. If the object requires no further treatment the cover-glass should be sealed with paraffin to prevent evaporation. The advantages of cutting specimens after this manner is the rapidity with which they can be severed, and the influence of the reagents can be studied directly under the microscope.

ALVEOLAR HEMORRHAGE—A SEVERE CASE IN PRACTICE.

BY E. N. NAUMAN, D.D.S., COLUMBUS, NEB. READ REFORE THE NEBRASKA STATE DENTAL SOCIETY, AT LINCOLN, MAY 19-21, 1903.

No doubt many of you present have had during your practice severe cases of hemorrhage which seemed very difficult to control for a time, but after using some of the well-known remedies at our command you succeeded in stopping the persistent flow of blood; and again, no doubt there are those of you who could not succeed with the usual remedies at hand, but who had to resort to your own genius and invented something on the spot which would and did stop the intermittent, fountain-like stream. To the latter this paper will perhaps be of no benefit; you had the experience and mastered the situation, and can no doubt do so again with like results; but to those who have not had a case where the ordinary remedies would not suffice my statements as to how a severe case of hemorrhage was controlled may be useful at some future time, and may save them some troublesome hours.

A gentleman, aged about 26, sandy complexioned, red-faced, farmer by occupation, presented himself at my office to have a lower left first molar extracted. The tooth was badly decayed, pulp alive and exposed. All other teeth in lower jaw on the same side were in their places. I injected a local anesthetic as usual and

extracted the tooth. It did not break and was no more difficult to extract than a tooth in that place usually is. I handed the patient a glass of warm water to rinse his mouth out, and waited for him to leave the chair. Soon he drew my attention to the amount of blood he had to expectorate every little while. I took some tannic acid and cotton, saturated the same with tincture of iodin and aconite, made it into the shape of a ball, and forced it down into the cavity of the extracted tooth, but it was only a few seconds until this was forced up and the blood came out as much as ever. I repeated the treatment without result. Next I took subsulphate of iron, tannin and cotton, the remedy with which I had never failed before nor since, and filled the cavity with it; but it too was forced up soon, and the blood squirted out as much as ever. Repeated trials of the last remedy, holding it in place for awhile, were of no avail; whenever I would take my finger away with which I held the plug in the cavity the blood would work up again. After so spending about an hour with him I noticed my patient was getting somewhat impatient, and he hinted that he would like to have his physician present, who had known the whole family for many years. I promptly complied with his wishes and called the doctor up. He came and tried all his remedies, internal and external, but the blood would not stop. After being with us for most of the time during two hours the physician had to leave, expressing the belief that the flow would soon stop, but it did not. I took the patient in my full charge again, held the plug in place for half an hour at a time, but the blood would always work out again when pressure was relieved. It was about 3:30 p. m. when I took the tooth out, but now it was getting late—about ten o'clock—I had not been to supper, and my wife came to investigate my absence. My patient's home was about eight miles out in the country.

I could stop the flow of blood as long as the cavity was plugged with subsulphate of iron and cotton held firmly down by pressure, but the pressure must not be relieved. I decided it would be uncertain to depend on the patient to apply that pressure, and therefore unsafe to let him out of my sight for hours to come. So I cut off the left wing of a lower impression cup, softened some modeling compound, filled the cup and pressed it firmly over the plugged-up cavity, had the patient bite onto this, and bandaged his head and jaw in such a manner that he could not open his mouth. "Now," I

said, "you go with me to my home and we will sleep together to-night, so that I may be near you in case the blood begins to flow again." We went to bed about 11 o'clock, after giving him some milk with a teaspoon through the partially opened mouth (the mouth being partially open on account of the cup and modeling compound on the left side). Several times during the night I examined him, and at 7 in the morning we arose and all was well; no blood had escaped since applying my invention. I fed him a couple of soft-boiled eggs and milk and chocolate, and sent him on home with strict orders not to remove the bandage, cup and modeling compound for four days, which order he obeyed, and of course had no more trouble.

PRESERVATION OF THE DECIDUOUS TEETH.

BY A. M. HARRISON, A.M., D.D.S., ROCKFORD, ILLINOIS. READ BEFORE THE ILLINOIS STATE DENTAL SOCIETY, AT BLOOMINGTON, MAY 12-14, 1903.

This subject is not a new one, as several of our members have written upon it, but it is new to most of us because as a rule we have not given it the thought and consideration which it deserves, deeming it of less importance than many other kinds of work which we have to perform. If a child should come into your office suffering from an exposed pulp in one of the deciduous teeth you would of course endeavor to relieve the suffering, but how many would do so by extracting the teeth, saying, "It is only a temporary tooth and another will soon take its place?" I fear we place too much emphasis upon that word temporary, and I consider deciduous a better term, meaning an organ that falls away or detaches itself after fulfilling its function. Of course it is the privilege of the dentist to do what seems expedient in a given case, and he may be busy, and it is further true that extraction is the easiest and quickest solution of the difficulty, but privileges and rights involve duties and obligations, and in this case the dentist's duty demands that he give that child the best and most intelligent service of which he is capable. If the permanent tooth has not already taken the place of the deciduous, and if absorption of the roots of the latter has not occurred, extraction is not justifiable and the dentist who performs it does not deserve the confidence which the patient places in him.

The experiments of Dr. Black have demonstrated that environ-

ment is the exciting cause of dental caries, and that where favorable conditions exist the most perfectly formed teeth are subject to caries, and where conditions are unfavorable even imperfectly developed teeth will resist carious action. Also, the time of susceptibility varies in the same individual. The environments favorable to caries are the same in the deciduous as in the permanent teeth, so far as we are able to judge, so the same prophylactic measures that are recognized as effective in the care of the latter should be employed in the case of the former.

All parents desire that their children shall have perfect permanent teeth, but about one parent in a hundred realizes the importance of preserving the deciduous teeth until their mission is accomplished. Many mothers would gladly cooperate with us in the proper care of their children's teeth if we did our full duty in explaining and emphasizing its importance to them. This would require only a few minutes of our time, and could be accomplished when they are having their own dental work done. These mothers give their little ones daily baths, keep them neatly and cleanly clothed, zealously wash their faces and hands when dirty, especially just before meals and upon retiring, but all this time the little mouths are swarming with every variety of bacteria known to that locality, pus is probably exuding from one or more fistulous openings, and the fresh food is mixed with that which lodged in the cavities and between the teeth yesterday or the day before. The filthy condition of the mouths of many little children is appalling to the sight and far more so to the olfactory nerves. I do not wonder that many of the first permanent molars decay before the deciduous teeth are lost. The marvelous thing to me is that any of the teeth erupting during this period and amid such surroundings escape annihilation by the ever-present microbes. If the protection of the permanent teeth while erupting were the only inducement for filling the deciduous ones it would be well worth our most able efforts.

The preservation of the deciduous teeth begins with the parent. I do not refer here to the diet of the mother during gestation and the nursing period or to the particular class of foods she shall feed the child, although the observance and study of these theories are productive of good results. I have reference mainly to the prophylactic measures the mother should employ in the care of the child's mouth from infancy, also teaching him how to use the brush effect-

ively so soon as he is capable of doing it himself. Almost without exception the dentist must teach the mother what he would have her practice in the care of the child's teeth. I have often been surprised at the ignorance of otherwise intelligent people on the subject of care for their own and their children's teeth. First show the mother that nearly all her fillings are between the teeth or in the sulci of the molars and bicuspids, and explain to her that the decay began in those places because they were not kept clean. Impress upon her mind this one fact above all others, namely, "A clean polished surface will not decay." Have a Sanitol or a Prophylactic brush near at hand and show her the best way to clean the teeth. First illustrate how injurious and ineffectual is the common horizontal brushing, by rubbing the brush back and forth across the back of the fingers, then brush vertically from the knuckles toward the ends of the fingers, and she will at once notice how the bristles go between the fingers and reach those surfaces which are not touched by the other method. Then open the mouth and pass the brush between the cheek and molars, almost close the lips and relax the strong cheek muscles, when there will be plenty of room for working the brush well up onto the upper gums, and brush downward by rotating the handle. The buccal surface of all the molars may thus be easily cleaned, and in like manner place the brush upon the gum of the lower molars and brush upwards. The same movement should be employed on the lingual surface except upon the anterior teeth, where the brush is drawn forward and outward. Urge careful brushing of the grinding surface of the molars and bicuspids. Be sure to place the brush well up onto the gums, for they also need careful cleansing if they are to remain healthy and free from debris, especially at the gum margin. Then show her how to use the floss silk—hold it taut between the thumb and finger of each hand, slip it back and forth between the teeth until it passes the contact point, taking care not to use too much force at this point and injure the gum, work it up and down against the tooth on each side, then release one end and draw the thread through, thus cleaning out the most inaccessible place as no other instrument will do. Some good dentifrice should be used once a day, and personally I prefer a paste which contains no soap, believing it to be the most agreeable, efficient and convenient. Place a small amount upon the dry brush, and do not take any water into the mouth until the teeth are thoroughly

brushed, then rinse carefully. Four or five minutes should be given to cleaning the teeth immediately after each meal. It seems like a waste of time for me to go over all these details and methods of cleaning the teeth before you, as you all know everything that I am telling and more too, but are you practicing it on your own teeth and do you explain it to your patients? If not, you should have to listen to this story over and over until the thoughts are translated into words and the words into deeds.

The teeth are primarily organs of mastication. Unless there is a thorough mastication of the food it is not properly assimilated, and the result is malnutrition. This is just as true regarding the deciduous as the permanent teeth, so it is just as important to preserve the former in perfect working order as the latter. In reality, it is far more important, for malnutrition of the child means not only additional susceptibility to disease during childhood but retarded or perverted development that may result in actual deformity. Looking at the subject from this standpoint, is not the preservation of the deciduous teeth well worth our most faithful efforts? The future health of our little patients may depend very largely upon the care which we give their first teeth. Preventing the decay when that is possible is in my opinion the greatest service we can render our patients; next to this is filling the small cavities so soon as they are apparent to the sharp eyes of the magnifying mirror and to the sharp exploring points, thereby saving the little ones and their parents from many restless nights because of nerve-racking, sleep-destroying toothache. If you will pardon a personal allusion I would say that the most terrific toothache I ever experienced was from a deciduous tooth when I was five years old. I remember very distinctly how long and hard it ached.

Another practical reason for caring for the deciduous teeth is to prevent irregularities. If a deciduous tooth is extracted prematurely the permanent tooth will not be in place and the socket will fill with new bone tissue, hard enough in many cases to turn the permanent tooth from its normal position. Fully as many permanent teeth are forced out of place by premature extraction and the crowding of teeth already erupted as are malposed by the deciduous teeth being left too long. Both of these causes of trouble may be avoided by having the teeth looked after at proper intervals. The little patient should make his debut in the dentist's office not later than

his fourth birthday, and should call for examination and any necessary work every six months until his sixth year is reached. From then on the visits should be every four months until he is twelve years of age, because during this period the deciduous teeth are usually replaced by the permanent, and there is no time in the lives of our patients when more careful supervision of the teeth is demanded of the dentist. Caries during this period is likely to be very rapid and extensive, so that a few months of neglect may result in irreparable injury. After the twelfth year the examinations should be made every six months. Of course these are general rules subject to such modifications as good judgment indicates in individual cases.

At the first sitting little work except cleaning the teeth should be attempted and the appointment should be brief. The efforts of the dentist should be especially directed towards becoming acquainted and securing the confidence of the little patient. After confidence has once been secured, never under any circumstances violate or attempt in any way to deceive. Never tell a child that what you are about to do will not hurt him at all when you know it will. You will deceive only yourself if you attempt this, and will utterly destroy the little fellow's confidence in the integrity of your statements and promises. You will render him fearful and suspicious of your slightest move, and he will dread the sight and even the thought of your office, your instruments and even yourself, all of which you will richly deserve. This is not a very pleasant prospect, especially when you have more work to do for him later, as you will be compelled to overcome by some means the dread and fear occasioned by your attempted deception. It may be that the child comes to you in fear and trembling, having been imposed upon by some other dentist. This makes little difference to the small patient—the crime was perpetrated in a dentist's office and by a dentist, and he probably thinks "All dentists look alike to me." Most of us know only too well from experience what a slow and tedious process it is to reestablish confidence and courage in these timid little hearts, yet it can be accomplished by kind, thoughtful and persistent effort, and certainly is the most important thing before us if we desire to do our work right and with the least expenditure of nervous strength to both dentist and patient. Nevertheless, I confess to having overcome one small boy by mere

strength of muscle and will power, as that seemed the only possible way of performing the operation. Such is an unfair advantage to take of a little fellow even when you know that there will be little or no pain. It is so much more satisfactory to be perfectly honest with our little patients, and this principle applies also to those who have long since lost their deciduous teeth, for many of the latter are not so brave as the former when properly trained.

If you know that a certain stage of the operation will be painful, use every agent possible and reduce the pain to the minimum. Then encourage the patient by commending his grit and bravery, tell him how much his courage helps you in doing the work better and more quickly, also with less pain to him. Do not hesitate to tell him that what you are about to do may be a little painful but that it will last only a moment, and that you know he will endure it because it is necessary. Proceed with the work while you are still talking, and do it quickly and thoroughly so that it will not have to be repeated. Nine times out of ten children if properly handled will endure this unavoidable pain like stoics. I have had them assure me that they did not mind it and that it did not hurt at all, although they might be struggling to keep back the tears. Watch their faces during these critical moments and do not prolong the pain long enough to cause a breakdown. Always praise their grit—it is the best tonic you can give them, and it is often effective with "children older grown." The little chaps usually deserve more credit than you are at all likely to express.

The operation I most dislike is extraction of the teeth—either the deciduous ones the roots of which are not absorbed, or the first permanent molars, when the parents will not consent to the administration of gas. Sometimes they feel that they cannot afford the additional expense, and if that is the only objection I simply tell them that I will give it without remuneration, as the confidence of a child in my ability and wish to do his dental work so far as possible without pain is worth more to me and the success of my future work for him than the price of the gas. Nitrous oxid administered by means of a Hurd inhaler is a most convenient aid to the dentist in many of the most painful operations for children, and as a rule they take the gas very satisfactorily. When a pulp in one of the deciduous teeth is exposed and aching no method is more effective and satisfactory than giving nitrous oxid, freely opening up the

chamber and removing the pulp, and inserting a soothing dressing of wine of opium, Black's "1-2-3," or campho-phenique. All this can be done while the patient is unconscious. The pulp canal should be filled at another sitting with gutta-percha cones moistened with oil of cajeput.

Oftentimes it is difficult to apply the rubber dam or we may not desire to subject the patient to the unpleasantness. In such cases the saliva ejector and cotton rolls usually answer the purpose. For the comfort of the child the work must be done rapidly, and an assistant who will roll cotton on the broaches as needed, attend to the saliva ejector, and have the instruments and materials ready as required, will aid very materially in shortening the operation. The foramina of the deciduous roots are usually large, and good-sized cones of gutta-percha are indicated. After they are pressed to place, moisten the cavity with oil of cajeput and work warm temporary stopping into the pulp chamber and canals. Finish the crown cavity with cement, base-plate gutta-percha, or amalgam. Oxyphosphate of copper discolors the tooth structure badly, but it is an excellent material for deciduous teeth where the color of the filling and tooth is not of especial importance, and it is the only cement which I have ever found which will adhere to a cavity that cannot be kept dry while the filling is being inserted. I have found its lasting qualities better than those of other cements, and have had good results by using it to line the cavity and then filling with amalgam. As a rule, cements and gutta-percha seem to meet the requirements of the deciduous teeth better than amalgam, except in large occluso-proximal cavities in the premolars.

About two years ago an effort was made in Chicago and in several of the smaller cities of this state to secure the cooperation or at least the consent of the various school boards to have the school children's teeth examined at the beginning of each term, the examination to be made by a reputable dentist appointed for the purpose, and a chart showing the exact condition of each child's teeth to be sent to his parents. Aurora is the only city so far as I know where the consent of the school board was secured, but this should not discourage us, as the plan has been tested in cities of other states and has been found of great value as an educational method of calling the attention of parents and children to the preservation of their teeth. The motive back of this movement is good, for it is

not that we as dentists may have more patients and more work, as the majority of these children finally come to us anyhow, but if the plan could be successfully carried out there is no doubt that the majority of parents would have the necessary work done for their children before unchecked caries had in many cases made reparative measures out of the question. We would then not have to listen to that lamentation so often heard—"If I had only known in time the condition of my teeth." In 10,000 children's mouths examined in England, 86 out of every 100 required skilled operative treatment.

I will close by quoting some of the rules recommended by the school children's committee of the British Dental Association and circulated for the information of the teachers and scholars of the national schools of Ireland—"Without good teeth there cannot be good mastication. Without thorough mastication there cannot be perfect digestion, and poor health results. Hence the paramount importance of sound teeth. Clean teeth do not decay. Decay leads in time to pain and the total destruction of the tooth." The substance of the following rules should be constantly impressed upon all children—"The teeth should be cleansed at least twice daily and always before going to bed. It is a good practice to rinse out the mouth after each meal. A small tooth-brush with stiff bristles should be used, and a little precipitated chalk may be employed if the teeth are dirty. All rough usage of the teeth, such as cracking nuts and biting hard substances, should be avoided, but their proper use in chewing is beneficial. When decay occurs it should be attended to long before any pain results. It is the filling of a small cavity that is of the greatest service."

Discussion. *Dr. J. W. Cormany,* Mt. Carroll, Ill.: During the past year I have endeavored to collect all the articles pertaining to this subject, intending to condense them for the Northern Illinois Dental Society for publication and distribution among the public, but there is too much of it. The more I have to do with children the more firmly do I believe that the best thing to do is to relieve them of pain, which is really all they want, and we should know how to do it. In case of an abscessed pulp a little "oil of joy"—equal parts of carbolic acid, oil of cloves, and eugenol—will relieve the pain promptly. You need not fear irregularities even if the deciduous teeth remain in place, nor worry about extracting them,

for they usually stay in place until the permanent teeth push them out, and children who have never had any attention whatever present with the permanent teeth erupting pretty regularly. Do not hurt a child the first time he comes to your office, but if we require many visits, as the essayist recommends, our time will be occupied entertaining children. He recommended honesty with little patients, and I say be honest with your old ones also, as dishonesty towards either class does not pay. I have come to the conclusion that it is all fear with us and we carry that fear with us all of the time. There is no reason for punishing children in any event—give them freedom from pain and nature will take care of the rest. People who have never had any dental work done are usually the first to cast reflections on the dentists, to jeer at those who have had their teeth attended to, and they are the ones who scare children and even adults.

Dr. F. H. Skinner, Chicago: I thoroughly agree with Dr. Harrison as regards giving children an anesthetic when extraction or a painful operation is necessary. I do not agree with him, however, as regards tooth pastes, as there are few that will remove accumulations or gelatinous masses from the teeth. Where the rubber dam is required I seldom use a clamp, but after adjusting the dam I hold it on one side with my finger and have the mother or my assistant hold it on the other. I believe three-fourths of children's fear of the dentist is due to overhearing the conversation of their parents, and the adults should be warned against talking over these matters before the little ones.

Dr. H. W. McMillan, Roseville, Ill.: I would emphasize the evil results which so often follow premature extraction of the deciduous second molar. About the sixth or seventh year these teeth are often decayed, but if they are extracted at that time the first permanent molar will slip into the space, because the action of the jaws is similar to that of a pair of scissors on a piece of wire. The wire slips forward, and the first permanent molar does the same thing, but you cannot very well get the latter back. It is the keystone of the arch and affects the placing of the whole permanent set. These second deciduous molars should not come out until the child is at least eleven years old. Dr. W. J. Brady has made a chart which shows the average time for extraction of all the deciduous teeth. With its aid you can explain to your patients that the teeth

should not come out until a certain time, and you can show them on the chart that irregularities are caused when they are extracted too soon.

Dr. F. H. McIntosh, Bloomington: Many dentists do not like to have children come to their offices because they do not care for them, and it does not take a child long to find out this fact. When confidence is gained you have little trouble, and frequently I would rather work for a child than for either of its parents.

Dr. F. B. Noyes, Chicago: The greatest element of success in treating children is to have real affection for them. Some dentists regard the description of methods of handling children as "horse play," and while children like you to play with them it can be overdone. They have just as much human nature as adults and require just as varied treatment. One rule holds good with all, however—from the first moment the child comes into your office devote your whole energy towards completely holding his attention. Continue your work, but keep his mind occupied with something apart from what you are doing. Sometimes force must be employed. I remember a child who bulldozed his mother and all who came in contact with him. He had found out that if he was ugly enough he could get about what he wanted. He tried the same tactics on me, yelling from the time he got into the chair. After persuasion and argument had failed I held him and went ahead with the work, upon which he became very docile and gave no trouble afterwards.

Dr. Harrison, closing discussion: I was rather reluctant to appear before this society, for I realized that my paper might well be termed "a kiddish effort upon kids' teeth, by one of them," but I am grateful to those who have dealt with me so kindly. I prefer a paste for cleaning the teeth because it will stay on the brush long enough to polish them, which cannot be said of some other agents.

COMBINATION FILLINGS FOR ROOT-CANALS.—Our well-known preference is for gutta-percha at the foramen and oxychlorid for the balance of the canal. By this method we avoid the objectionable features of both materials when used separately, viz., the leakage in gutta-percha and the forcing of oxychlorid through the foramen. Used in the way we have recommended, these materials logically and practically combine more of the qualities of an ideal root-filling than can be obtained with any of the other materials commonly used.—*Western.*

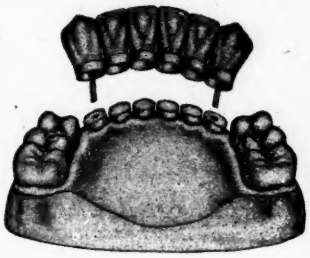
Digests.

APPLIANCES FOR THE FIXATION OF PYORRHEAL TEETH. By George W. Warren, A.M., D.D.S., Philadelphia. The most troublesome conditions with which we as dentists have to contend are those resulting from pyorrhea. Nearly every practitioner to-day who gives the attention to pyorrheal troubles that his duty demands recognizes that true pyorrhea is the result of systemic as well as local conditions, and to be successfully overcome must receive systemic regulation in conjunction with local hygienic and stimulating treatment.

It is not my intention to dwell upon details of either the general or local *régime*, but rather to present that phase of the surgical aspect calling for some form of a retaining bridge or splint. A matter of the first importance in the treatment of cases where the alveolus

FIG. 1.

FIG. 2.



appears largely or entirely destroyed, leaving the affected teeth quite loose, is that of mechanical fixation. The lower anterior teeth, having small and single roots, with a very thin alveolus, together with the great stress brought upon them in masticating, are the ones usually calling for this form of treatment. Both for the welfare of the individual teeth and the comfort of the patient, these loosened organs must be made stable.

We have had presented from time to time operations for this purpose, from the simple ligation of the loosened teeth with silk thread or wire to the radical operation recently presented by Dr. Ames, where he excises the affected teeth, adjusts crowns to the roots, then makes one continuous piece of these by uniting them with a little solder; completing the operation by setting the connected

crowns as one piece. I have attempted to illustrate these two extremes—the simple and the complex—in Figs. 1 and 2.

In deciding upon a splint there are these points to consider: (1) We should have something which will give the loosened teeth firm retention and rest, either temporarily or permanently. (2) Our appliance should be one which will cause as little mutilation of the teeth as possible. (3) It should be as inconspicuous as we can make it. (4) It should be an appliance which will not interfere with the teeth and itself being kept clean.

Some years ago Dr. William H. Trueman advised drilling a small hole through the center of the incisal third of each crown from the labial to the lingual surface. A bar was fitted to the lingual surface of the loosened teeth, small gold pins adjusted to pass through these were soldered to the bar, after which it was drawn tightly to place by small, thin nuts, these being worked down on the threaded ends of the pins. The ends of the pins and edges of the nuts were afterward dressed down with small stones and disks. This form of appliance has proved very satisfactory in Dr. Trueman's practice.

Another operation which has been advised is the fitting of small plates to the lingual surfaces of the loosened teeth. These are then tacked together with a little solder, making one continuous piece. The plate is then perforated about midway between each tooth, and a small gold wire passed through and tied upon the labial surface.

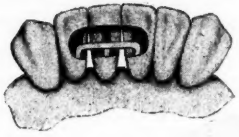
A somewhat different method, and one practised by several of the older men in the profession, is to devitalize the pulps of the affected teeth and of the teeth to which the appliance is to be anchored, after which a continuous plate is made to fit the lingual surfaces, and long platinum wires are adjusted to the canals and soldered to the plate. The fixture is then cemented in position.

There are those who to-day advise either the wearing of a swaged continuous partial gold cap, cemented in position, or the fitting of a succession of gold rings or bands around the teeth, which are soldered together and set with cement. The objection to both of these methods must be obvious. They represent the most unsightly and unhygienic form of any splints thus far devised.

What we might call an anchor-bar, or a bar-splint, is that introduced by Dr. Rhein. The method is a simple one and no doubt is quite effective, but as you will notice, it necessitates considerable mutilation of the teeth. The next diagram (Fig. 3) illustrates one

of Dr. Rhein's cases, and "shows the manner of fitting a permanent splint to loosened lower teeth." The pulps have been removed and a staple of triangular shaped platino-iridium wire, with three parallel pins fitted into the three individual root-canals, is seen lying in position. Dr. Rhein fails to say what means he employs for fixing or setting his appliance, but I presume it is by packing amalgam about the bar and pins. The next illustration (Fig. 4) shows another application of the bar method. This also is from Dr. Rhein's practice.

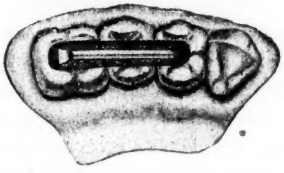
FIG. 3.



We see in this an iridio-platinum wire anchored into two bicuspid teeth from which the pulps have been removed, and extending into a large filling on the masticating surface of the molar.

Now, it is not always desirable to devitalize the pulps of these teeth, especially the firmer ones to which the loose teeth are anchored, and frequently patients object seriously, and not without reason, to the wholesale destruction of pulps and of tooth-surface. To overcome these objections and to meet the requirements of such a fixture,

FIG. 4.



as I have enumerated them, I have for several years employed the lingual plate attachment, embracing the incisors and cuspids, securing the device in a manner similar to that introduced by Professor Litch in his plate-and-pin bridge.

To prepare a well-adapted lingual plate, the first important question is how to secure an accurate model of the teeth in their normal position. I have employed two methods—first, by tying the teeth together with silk thread, then allowing the patient to close the teeth

as in masticating, and while holding them in this position the lower incisors are pressed into their normal adaptation to the upper teeth. They are then coated with a little oil or glycerin, and a plaster-of-Paris impression taken. In this great care should be taken to break or crack the impression as soon as crystallization commences. The second is the taking of a sectional impression. This has been very clearly described by Dr. Cigrand, and I give it somewhat after his writing. First, we must have the mouth as dry as possible, have the patient close the teeth, giving the natural occlusion, then while they are held in this position work about the labial surface of the anterior lower teeth a roll of softened modelling compound or tough wax. After this has been carefully fashioned to the teeth it is thoroughly

FIG. 5.

FIG. 6.

FIG. 7.

chilled with cold water. Then request the patient to release the bite, and proceed to place a similar roll of compound or wax about the lingual surfaces of the teeth, being careful not to cover the incisal edges; then chill the impression as before. If this has been carefully performed we have accurately registered the position of those teeth as they stand during mastication and under no strain other than the contact of occlusion. We are then ready to take a plaster impression of the incisal edges with the compound in position. This completed, the sectional impressions are all placed together in the impression cup and the model and dies secured in the usual way. Before taking the impression, however, the pits should be drilled in the lingual surface of the cuspids and any additional teeth which we may wish to receive the pin attachment.

We usually find in these desperate cases that the bulbal portion of the pulp is at least partially calcified, which allows us to make good anchoring pits for the pins. Where but one of the incisors is loose it may also receive a pin to add to its security, or if it is thought best to devitalize the pulp of this tooth a longer pin can be used, extending into the pulp chamber. When all of the incisors are suffering I secure an accurate die of the labial surfaces of these teeth and swage a small platinized-gold wire to fit closely over the largest part of the incisors, the ends of which are then flattened so as to pass between the lateral incisors and the cuspids. The appliance is then transferred to the plaster model, which has the previously finished lingual plate secured upon it. Both ends of the wire are then passed between the teeth mentioned and through small openings in the lingual plate and soldered; the ends are then finished off. The fol-

FIG. 8.

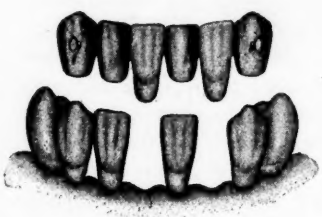
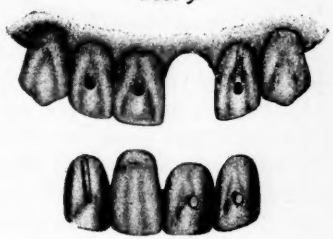


FIG. 9.



lowing illustrations depict this method: Fig. 5 shows the lingual surface of the teeth properly prepared. Fig. 6 represents the fixture (reverse side shown) ready for adjustment, while the next illustration (Fig. 7) gives its appearance upon the model or in the mouth. In the next diagram (Fig. 8) we have shown the method applied to the substitution of lost teeth combined with the support of the remaining incisors.

The application of the same method in the treatment of upper incisors is shown in the next drawing (Fig. 9), showing the lingual aspect of the natural teeth and the reverse side of the appliance. This represents a case which was successfully treated about eight years ago and is to-day giving satisfactory service. When the patient came to me he was wearing a rubber plate, which was supporting an artificial left central incisor tooth, replacing the one which had dropped out. The other incisors were somewhat loosened and he

feared their loss. The left lateral incisor contained a devitalized pulp, which I removed. The teeth were all treated, and the appliance as represented was made and placed in position.

This system may not be entirely new. My claim is that it is neat, not making a great display of gold, does not interfere with articulation, does not necessitate mutilation of teeth, and, lastly, it gives us practical immobility of the affected teeth, which is of prime importance in their therapeutic treatment. I might add, too, that where it is desirable to remove the fixture, this is one which can readily be detached, allowing the teeth to resume their natural independent function.—*Brief.*

PREPARATION OF CAVITIES FOR INLAYS. By C. N. Johnson, L. D. S., D. D. S., Chicago. One of the chief stumbling blocks to the greatest perfection in the use of inlays lies in the habit of thought of the average practitioner regarding the fundamentals of cavity preparation. The use of ordinary filling materials which are inserted piece by piece, or in a soft mass which subsequently becomes hard, has developed a system of cavity preparation with certain underlying principles which have become grounded in the minds of the profession, and it is difficult for them to take on a new point of view in the formation of cavities. This it is necessary to do if they are to obtain the best results in inlay work, and it is to this particular phase of the subject that the present paper is directed.

The first thing for the prospective inlay worker to do is to readjust his ideas regarding the detail of cavity formation. No matter what particular system of cavity preparation he has been following in the insertion of ordinary fillings he may be assured that it will not answer for inlays. A cavity properly prepared for an inlay will not hold, with rare exceptions, a foil filling or an amalgam filling much longer than while it is being inserted. A gold or amalgam filling is held in place mechanically by reason of the cavity walls being made of such a shape that when the filling material is molded to them it cannot be lifted out without breaking either the walls or the material. An inlay is held in place by a cement substance, and in view of the fact that it is inserted in one piece the cavity must be of such form that the inlay may be lifted out of the cavity and replaced at will without injuring the cavity walls or the inlay.

It will thus be seen that there is a fundamental difference in the

principle involved for the two methods, and while this must, of course, be apparent on the surface its true significance does not seem to be readily grasped by the average practitioner when he essays to do inlay work after having been accustomed to inserting ordinary fillings. As has already been said, it requires looking at the matter from an altogether different point of view, and unless practitioners will do this they will not get the greatest benefit from inlay work.

A few variations in the detail of cavity formation for the two methods of fillings and inlays may be pointed out and illustrated with possible profit, not as constituting all of the differences which arise in practice but merely as indicative of the distinction between the line of thought in the one instance and the other.

The first fundamental requisite for inlay work is that the cavity

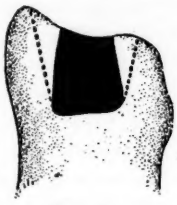


FIG. 1.

FIG. 2.

FIG. 1 represents a filling in the proximal surface of a lower molar, with dotted lines extending on either side to show where the cavity should be carried for another kind of filling mentioned in the text.

FIG. 2 shows cavity extended and the sharp tips of enamel slightly overlapped with filling material.

must ordinarily be more widely extended on the surface of the tooth than for fillings. In other words, the orifice of the cavity should be well opened out. This with some cavities involves the cutting away of much sound tooth tissue, but unless the operator has the courage to do this he will have little use for inlays in such cavities; for instance, as proximo-occlusal cavities in bicuspids and molars, or in fact in any cavity involving two or more surfaces.

In Fig. 1 is illustrated a filling in a lower molar. While this cavity in its outline does not seem altogether typical or ideal, yet there are many cases in which decay has so extended bucco-lingually on the proximal surface as to require the width of cavity here illustrated in the gingival region without seriously undermining either the buccal or lingual cusp. In these cases the relative width of the cavity bucco-lingually in the gingival region and at the mar-

ginal ridge may be as represented—the gingival width being greater than that near the occlusal surface. This for an ordinary filling is permissible, and in fact many cavities are so prepared in practice with good results, particularly in teeth which are so formed that there is a decided curve from the contact point on the proximal surface over to the occlusal surface, leaving a flattened or broadened marginal ridge. In such teeth to extend the cavity wider buccolingually at the marginal ridge than it is near the gingival region would be wholly uncalled for if a filling of gold or amalgam were to be used, but it is manifestly certain that such a procedure is necessary in the case of an inlay. (It may be said in passing that this matter of the conformation of the teeth has more to do than has generally been accredited to it with deciding between the use of fillings and inlays in certain cases.) No inlay could be successfully fitted or inserted in a cavity formed as here illustrated with all of the teeth in their normal position in the arch. The only direction in which a matrix could be lifted from this cavity without warping would be proximally, and this cannot be done on account of the tooth next in line.

So if an inlay is to be used it is evident that a change in the form of the cavity outline must be made in accordance with the dotted lines in Fig. 1. This frequently involves another question which must not be overlooked. We must never leave too sharp an edge of enamel pointing occlusally in these cases where the stress of mastication is great, and in such a cavity as the one illustrated it would be necessary to slightly shorten and bevel the enamel and let the inlay lap over it and protect it as shown in Fig. 2. This applies of course more particularly to gold inlays, which are better calculated than porcelain to protect the enamel and which on account of greater strength to give bulk are, to the mind of the writer, more frequently indicated for these cases than porcelain inlays.

Unless the tips of the cusps into which such a cavity frequently terminates be materially shortened there will result either one of two things, and sometimes both—the margin of the enamel will be too sharp and frail or the edge of the inlay so thin as to offer inadequate protection to the cavity margins. The operator who hesitates to cut away freely in such cases will fall short of doing the greatest good in inlay work, and the argument is all the stronger

in view of the fact that such cutting is usually accomplished without pain.

Another radical difference in cavity formation for inlays and fillings relates to the interior of the cavity. With cavities prepared for the anchorage of fillings the best results are to be obtained by the creation of sharp angles between the walls in the interior parts of the cavity where the walls join each other. For instance, in a cavity such as the one under consideration the axial wall should join the buccal, lingual and gingival walls at right angles. Into a cavity so formed a foil filling or one of amalgam can be built with the greatest ease and the utmost certainty of permanent retention. But for inlays these angles are clearly contraindicated. All walls must join each other on curves instead of at angles; in fact, the general scheme of cavity preparation for inlays must be one of curves with no sharp angles, undercuts, or other resistance points such as are resorted to for fillings.

If the operator will bear these things in mind when he approaches inlay work he will attain a greater measure of success than he otherwise would, and while the inference is not here made that all cavities for inlays should be shallow or saucer-shaped, or that depth of cavity for retention should be ignored, yet the general plan for inlays and fillings is so diverse that the operator requires a different line of thought for the one than for the other. As has already been stated, this seems difficult to grasp for many of those who essay inlay work, but until they do so they cannot hope for the greatest measure of success.—*Summary.*

SINUS OF THE FACE. By James E. Power, D.M.D., Providence, R. I. Mr. A., aged thirty, called at my office on March 10, 1903, for my advice. As is customary in cases requiring surgical intervention, I first proceeded to get a history of the case, which was as follows: During the past few years, and about once each year, the patient had been annoyed by his face assuming abnormal proportions. There was no pain associated with this swelling, so his sufferings were confined to the mental rather than the physical nature. He had adopted no special treatment, as the swelling had always disappeared without it until the last attack, which occurred in January, 1903. At this time he became worried and visited a surgeon for advice. He diagnosed the case as one of "obstructed

sebaceous duct," and advised the application of an ointment. The patient used this for a few days, at the end of which time the swelling had increased, and the pus which was now present became confined to one particular area, under the condition which is sometimes known as "pointing." The surgeon then made a vertical incision, perpendicular to the body of the jaw instead of horizontal and parallel with it—leaving an unsightly and inexcusable facial disfigurement. He discharged the patient with instructions to return every second day. The patient carried out said instructions, and during the next month his face was incised four times—that

is, the first incision was reopened four times—but his condition was not improved.

After obtaining the above history I made an examination which revealed the following conditions: The face was very much swollen, very sensitive to the touch, due probably to the presence of pus in the tissues, and highly inflamed about the area of the old incision, which had now closed, as no wick had been used to keep it open. The pus was centered at this point and was ready to break through under the least pressure. I next examined the inside of the mouth and found everything normal, with all the teeth present on that side of the mouth. They seemed to be free from caries, and questioning

of the patient convinced me that he had never experienced toothache of any sort. I examined more closely, and found the lower left third molar tipped slightly forward in such a manner that the upper anterior surface of the third molar rested against the second molar, as is shown by the diagram (which was drawn from models).

By means of an ordinary surgical knife I reopened the old incision on the outside of the face, and by pressure expelled about half an ounce of thick yellow pus. I then introduced a surgical probe into the opening, backward and downward for about one inch and a quarter. I could not force it into the oral cavity, neither could I feel it when I put my finger on the inside of the cheek, as it seemed to be imbedded deeply in the tissues. I removed the probe and advised the patient to have the lower third molar extracted and the socket thoroughly curetted, as a cure for his trouble, as I thought it due to the position of the third molar, causing undue pressure. He did not seem satisfied that his teeth could have caused this difficulty, as he had never had a toothache, so he paid me for my advice and departed.

About three months later he called at my office again; his condition at this time was much worse; the incision had been made longer; he was suffering from pain in his cheek, and his jaws had become closed so that it was impossible to pass a No. 4 mouth-mirror between the upper and lower teeth. He told me he had been treated by two surgeons, to whom he gave my diagnosis, and both of these gentlemen said it was not correct. One said it was due to an obstructed sebaceous gland, and treated him accordingly. But as the patient did not improve, he visited another surgeon, who said he had necrosis and who opened and extended the old incision, at the same time curetting the bone. He made twenty or thirty visits to this latter practitioner, and seemed to be continually getting worse.

When he again presented himself to me he was willing to submit to any treatment I might suggest. I made arrangements for the operation on May 8, 1903, when it was performed as follows: I first gradually forced the mouth open and extracted the lower left second and third molar teeth. I curetted the sockets thoroughly and irrigated them. I next introduced the probe into the opening on the outside, which was opposite the first molar tooth, as is shown on the diagram, and passing it backward and downward

toward the angle of the mandible it did not appear in the mouth, so I began to feel with my finger in the socket of the third molar. I soon felt the end of the probe, which I gradually bent and directed through the natural opening of the oral cavity. With the probe in position, I had the accompanying diagram made by an artist whom I had present. I then removed the probe, and syringed through the surgical opening into the mouth a warm solution of dioxid, followed by glyco-thymolin. Then I passed a wick of plain sterilized gauze, upon which I sprinkled "modoformal," through the same opening into the mouth, and put on a bandage.

I carried out this treatment every day, making the wick shorter and syringing each time. After the third day I injected a four per cent solution of silver nitrate through the tract before inserting the wick. This was done to promote granulation and to assist the opening to close, which it did from within outward, and on the eighth day I discharged the patient cured; sinus entirely healed. I shaved all the hair from the outside of the cheek, and kept it this way during my treatment.

This is one of the many cases which I have had the good fortune to either observe or to treat tending to prove that the teeth are of more importance in the conditions of the body requiring the services of a general surgeon than is ordinarily supposed. I report the case purely from a sense of duty, hoping that others may derive benefit therefrom, as the experience of others has helped me. If this report will assist in relieving any unfortunate patient, or assist even one of the many brother practitioners who read this journal in clearing cases which may be termed obscure, I shall feel that the mission of this report has been accomplished.—*Cosmos.*

ORAL SURGERY—A FEW OF MANY CASES WHICH THE DENTIST SHOULD BE ABLE TO DIAGNOSE AND TREAT. By Wm. L. Roberts, D.D.S., Denver. Read before the Colorado State Dental Association, at Denver, June, 1903. As the title indicates, I am about to speak of some of those diseases and diseased conditions of the oral cavity and jaws that require surgical treatment and which should seldom, in fact, should never be allowed to go out of the dentist's hands. It is eminently essential that even though you may not desire to operate yourself you should be able to prop-

erly diagnose any diseased condition. I believe you will agree with me when I make the assertion that the origin of most diseases of the mouth, jaws and associated parts can be traced to diseases of the teeth, and as we are especially interested in the teeth and surrounding parts I have confined myself almost entirely to some of the most prevalent diseases resulting from septic material discharged from putrescent or decomposing pulps, namely, necrosis, tumors, diseases of the antrum, etc., as frequently met by us in everyday practice.

Necrosis.—First I will consider necrosis, which is the death of a large or small portion of bone in mass and usually the result of absolute and permanent arrest of function; this is unlike caries, for caries is the molecular destruction of bone and corresponds to ulceration of soft parts. As we meet it in practice necrosis is commonly due to non-traumatic infective inflammation. It may begin as a general osteitis, bone being destroyed by arrest of circulation, thus cutting off nutrition, or the periosteum proper may be affected, due to its nutrient structures being destroyed. The dead portion of the bone, or sequestrum, is of irregular shape, presenting rough edges, and usually separated from the remaining structures. Separation occurs by a process of demarcation like necrosis of the soft parts, consisting of an area of absorption of calcareous matter. The sequestrum acts as a foreign body, and by its continued irritation keeps up a suppurative inflammation of the surrounding parts or tissues. Usually there are fistulous tracts communicating with the exterior.

Necrosis is common in both superior and inferior jaws and in my experience is more frequent in the superior. If the sequestrum is peripheral and has been discharged the periosteum or the bone may replace the lost tissue. If for any cause the sequestrum is not thrown off suppurative inflammation may continue for many years and the sequestrum become enveloped in a case of new bone. This is more likely to be true in the inferior jaw, and it is then necessary to break through the new bone to get at the dead part.

Deep-seated pain, inflamed and swollen gums usually precede necrosis, the teeth become loose and sinuses form in every direction, giving exit to pus. On passing a probe dead bone is easily felt and recognized by the high-pitched and clear note, altogether different from that given out by healthy or carious bone. When separation

has taken place it can generally be recognized by the mobility of the sequestrum. A small sequestrum may make its way to the surface and be thrown off, but the process is slow.

The causes of necrosis are numerous and I will enumerate those which interest us most and are liable to be met with in everyday practice. They are, impacted third molars, septic condition of the teeth, syphilis, phosphorus, mercury, arsenic, etc. The most common of these are syphilis, mercury and arsenic, and I will cite but one or two cases of the many that have come under my observation within the past few years.

Case from Practice.—Female about sixteen years of age; left inferior first molar; arsenic had been applied to devitalize pulp about six months previous. I found tissue and periosteum entirely gone from lingual, buccal, mesial and distal portions of process, and extending about two-thirds over roots of teeth on either side. Process was absorbed or eaten away and tooth very loose; it was removed. I curetted away all necrosed bone, washed out with antiseptic, dried and applied aromatic sulphuric acid freely. A few dressings and the tissues began healing, and were nicely restored with the exception of a large depression where process and bone were removed.

Case II.—Woman of forty-seven years, syphilitic, left inferior maxilla involved from third molar to first bicuspid. Here I found a typical case with sequestrum, fistulous opening, even to exterior of face. Made long opening and removed sequestrum, curetted, washed out with H_2O_2, followed with aromatic H_2SO_4 and also through tracts. A few dressings caused external openings to close up and finally the wound in the mouth. (I will pass around the sequestrum which I removed from this case.) I might enumerate several other interesting cases, but think these will suffice.

Besides the local treatment in these cases of necrosis, if I do not send the patient to his physician I generally advise a tonic and stimulating constitutional treatment, plenty of fresh air and nourishing diet. For a local wash, sanitol liquid or some antiseptic solution. Of course the strictest antiseptic precautions should be observed, as the danger from pyemia and septicemia is considerable.

The Antrum.—Of diseases of the antrum I will say but little, for I know every one has his pet ideas of operation and treatment. Diseases of the antrum are usually but not always simple in character,

easily diagnosed, and as a rule yield readily to treatment. The average dentist is better qualified than the physician for discovering these conditions at their inception, as he has far greater opportunity for coming in contact with them and should know the anatomy of the region.

The most prominent source of trouble in this cavity is probably some lesion secondary to diseases of the teeth. Although all teeth may be missing and the dental arch appear healthy, yet we must not jump at the conclusion that the source of trouble lies in some other direction. The root of some one of the molars may have been broken off at time of removal, an ulcer formed, and the relation of root with antrum may have been such that it vented into the antrum. A broken root may have been forced into antrum, as I once found. Blows, severe colds and many other minor causes all are liable to bring about the diseased antrum.

To diagnose a diseased antrum in many cases is easy; in a few it is very difficult. The electric mouth lamp, history, flush and fullness of cheek just above cuspid fossa are all good diagnostic signs, but I have seen them all fail and only the insertion of an aspirator and removal of some of the contents correctly told the tale.

Treatment.—If the molars are sound I let them alone and trephine through the bone above roots and on a level with floor of antrum; I make an opening as large as one's little finger, and larger if necessary. In this way I am able to know what I am doing, as by using retractors and the electric lamp I can get a pretty good view of the interior, or the floor at least. I first syringe cavity out with a warm saline solution, then follow with H_2O_2 diluted one-fourth. I am criticised by some for this, but the H_2O_2 boils out the pus and blood better to my way of thinking than anything can flush it out. If I find it necessary to curet, I do it now, and also use a bone bur if demanded. When convinced that I have removed the cause I syringe out with warm saline solution, follow with a saturated solution of boracic acid, or glyco-thymoline one-third strength; place gauze in opening and discharge patient. At subsequent sittings I follow practically the same course as above until no sign of pus appears, when I freshen edges of wound and bring them together with two or three stitches. I never use a canula any more. To say that all the cases always heal up and get well would not be the truth, but

fully 90 per cent in patients of good constitution do and I never hear from them again.

Some ask, do you anesthetize your patients before you operate? Usually I do not. Sometimes I inject a local anesthetic where opening is to be made, but this only benumbs the soft tissue, and as soon as I touch the bone the pain is just as severe. In most of the cases during the past winter at the clinic of the Colorado College of Dental Surgery I have said nothing to the patient, but just proceeded with the operation, and I think some of you who are present and saw me operate in those clinics will agree with me when I say the patients were good and made very little complaint. If you use a general anesthetic you cannot help but keep your mind on the patient and away from the operation. Usually only a few minutes are consumed in opening the antrum and the patient will endure it.

Wounds.—Of the various tumors, wounds, etc., that are brought to our notice, and which we ought to be able to diagnose and treat, I might mention and describe a few and will begin with wounds. Accidental wounds of the lips and mouth are usually incised or lacerated. If badly torn the ragged edges should be smoothly trimmed, washed out with a sublimate solution and secured with interrupted silk sutures. When the wound is through the entire thickness of the lip the sutures should include the mucous membrane. A very fine suture should be used in the vermilion border to insure absolute approximation. Adhesive strips are not reliable here. In children the silkworm-gut support should be employed, as it resists the constant strain to which sutures of the parts are subjected in the act of crying.

Tumors of the Lips and Mouth.—Diseases of the lips are of various kinds and include epithelioma, lipoma, ulcers, general hypertrophy and fissures. One of the most frequent causes of removal of portions of the lip is the presence of epithelioma. It is a disease of middle and old age, involves usually the lower lip, and occurs in the great majority of instances in males. It may occur without any appreciable cause, but in the majority of cases the appearance of the neoplasm is preceded by prolonged irritation at the place involved. A jagged or projecting root, large accumulations of tartar at the gingival margin, the habitual use of a pipe stem are frequent causes. Irritation caused by chronic fissure or ulcer of the lip is another symptom. It begins as a small ulcer with rather abrupt

margins, in the bottom of which is a dirty granulation tissue, partially hidden by thin pus. In its earlier stages it is not readily distinguished from the benign ulcer which may be found upon the lip. A preceding history of prolonged irritation should always suggest epithelioma, especially if it occurs after the age of thirty and upon the lower lip. Labial chancre may be differentiated by the indurated base, which is characteristic of this lesion; adenitis in the line of lymphatics along the lower jaw comes on in the earlier stages of syphilis, while in epithelioma the sore may exist for months without perceptible enlargement of the lymphatic glands. In syphilis the appearance of the eruption, together with the history of the case, will lead to correct differentiation. Epithelioma of the lip is a dangerous affection. If neglected it destroys life in from one to four years. It spreads at times with rapidity. It may confine itself to the soft parts or attack the maxillary and nasal bones. Engorgement of the submental, sublingual, submaxillary and cervical glands is almost inevitable if the disease is not controlled early. Marsden's paste, while preferable, in epithelioma of the skin, is second to the knife in the treatment of this disease in the locality under consideration. The incision should be well away from the infiltrated margin, and if any lymphatic glands are enlarged they also should be reremoved. After removal plastic surgery should be employed in restoring the part to as near the normal condition as possible.

Cystic tumors of the lips are not infrequent, occurring as spherical swellings beneath the mucous membrane. They are caused by obstruction of a duct of a labial follicle, and contain a thick ropy fluid. The treatment involves a careful and thorough excision of the sac. No stitches are usually necessary in these cases, the wounds healing nicely if left alone.

The tumor that is most commonly met in the mouth is the epulo-pulp-fungoid, and right here is where we must be careful to diagnose correctly between this and an odonto-periosteal growth. The epulo-pulp-fungoid is of common occurrence and generally easy to control. It is a fungoid growth of an exposed degenerating tooth-pulp. It is seen in a thousand cases to one of any other form of epulic growths. As found they are surrounded by the walls of the pulp chamber or root canal and are diagnosed by finding them pendulous, very vascular and variable in size. Treatment: Cut them out and control hemorrhage with 25 per cent pyrozone or adrenalin.

The other form, simulating the pulp fungoid very closely as to location, but requiring entirely different treatment, is the odonto-periosteal growth. This tumor is also seen to arise from the pulp cavity, but when you come to trace it down with a fine sound you will find a break, either at the bifurcation if it be a molar, or at the side of the root, and is an outgrowth of the alveolar membrane. This form then is not a pulp-fungoid growth. The only treatment known to me is the removal of the tooth, curetting socket or removal of a small portion by use of bur or bone forceps. Follow this with application of aromatic sulphuric acid and the trouble will soon disappear.

While there are several other varieties of epulides, I will speak of but one more, and this one simply because of my extreme good luck in being able to show you a part of the tumor itself. I refer to the erectile form. This bottle contains one-half of the largest epulo erectile tumor that it has ever been my good fortune to see or remove. This specimen I at first diagnosed as an odonto-periosteal growth, and with the history as elicited from the family and family physician I had in my own mind decided it to be malignant. Patient was given a general anesthetic, and only then did I have a chance to make a thorough examination, when to my utter surprise I found it to be a simple erectile epulis, which was easily removed and did not return. A microscopic examination of the other half was made which settled the malignancy question. Any epulis that you cannot prove to be benign you must consider cancerous and treat with the latitude given to cancer.—*Items.*

REFLEX NEUROSES OF DENTAL ORIGIN AS MANIFEST IN EYE, EAR, NOSE, AND THROAT DISEASES. By A. D. McConachie, M.D., D.D.S., Baltimore. Read at the seventh union meeting of the Maryland State Dental Association and the District of Columbia Dental Society, at Baltimore, May 21, 1903. My first thought when asked to address you on this subject was to report a number of cases bearing upon the various reflexes of dental origin; but it seemed unnecessary, as I believe everyone present can call to mind cases of the very character I shall refer to in a brief *résumé* of this important subject.

Before entering into the subject I trust you will pardon me in digressing to speak a few words on the importance to the dentist of

a thorough knowledge of the fundamental studies—anatomy, physiology, chemistry, materia medica and therapeutics, pathology and bacteriology. Dentistry cannot be divorced from medicine. It is as much a specialty of medicine as is ophthalmology, otology, laryngology or rhinology. The dentist's education must not be solely manipulative. He should be grounded in the general principles of medicine and know how to apply them to his specialty. The mouth cannot be isolated from the rest of the body. The same blood that circulates in the mouth and teeth circulates in the heart, liver, kidneys and extremities. Hence, with such a broad blood supply and nervous connection, with such great possibilities for irritation and remote nervous manifestations, you must understand the whole body and make a study of it in its completeness before you can render the most suitable treatment—whether preventive, palliative or curative —in the various diseases of the oral cavity. The principles of disease are the same whether they occur in the deep-seated internal organs, the extremities or the teeth. A working knowledge of these elementary principles in one set of organs requires the same studies as that of any other group of organs of the body. Your surgical procedures do not differ from those elsewhere in the body. The same aseptic and antiseptic principles are as necessary in dentistry as in general surgery.

That dentists are fully appreciating the systemic causes of the local conditions they treat is significant of a rapid advance and elevation of the standard for graduation. The advance to a four years' course is significant and prophetic of a more thorough familiarity with the fundamental studies. It seems to me to indicate that the schools mean to exact more thorough knowledge of those subjects which have hitherto been thought to have little to do with dentistry by the average graduate. Medical and dental students should be educated upon the same lines as to the fundamentals, diverging only in the higher branches and laboratory work.

In my criticism of educational standards I must not neglect to arraign the medical graduate before the bar of ignorance as pertaining to the principles of dentistry. The medical graduate should fully understand the process of dentition in its relation to local and constitutional effects. Every close-observing medical man—no matter what specialty he practices—cannot help appreciating the invaluable aid afforded by a familiarity with the clinical appearances

found in the oral cavity and teeth. I need only refer to the discoloration of the gums in metallic intoxications, to the bleeding, spongy and hypertrophied gums in scorbutus, to the salt incrustations of teeth in gout, to indicate the valuable knowledge in diagnosis which familiarity with oral conditions affords the general medical man. Again, in treatment, how frequently do we see remote neuralgias—supraorbital, infraorbital, occipital, frontal and ocular—baffle us until the dentist discovers and removes an exposed pulp.

My personal experience has been so replete with instances of the invaluable services of the dentist's skill that I feel I should be only half prepared for my special work were I not a dental graduate. Thus the utility of all kinds of knowledge is made evident if we would be broad-gauge in our work as specialists. Medicine is one and embraces the whole man. The specialist, be he dentist, ophthalmologist, or any other "ist," must not become narrow, but look upon the body as a whole composed of units so correlated that a disturbance of one produces discord in every other. Keeping these facts in view must develop a widespread interest among dentists and physicians as to their mutual aid and relations.

Now to the subject assigned me: In regard to the nature of reflex neuroses, suffice it to say that we usually understand by it a process consisting of a nervous impulse starting at the peripheral termination of a sensitive nerve, carried through it to a sympathetic center, and from there carried back to its source, or to a distant point, where it manifests itself in an excessive or disordered vasomotor, sensory or muscular activity. To account for this disordered activity we may suppose that the terminal nerve filaments are diseased or subject to undue irritation by disease of their environment; or that there is disease of the nerve trunks or their ganglia, or that there is a general sensitiveness of the nervous make-up of the individual. Pathologists have as yet not determined the real facts in the case. Clinicians, from the phenomena observed, vary widely in their theories and hypotheses. Within the last decade—the era of the rise of specialism—each specialty in its turn has laid claim to the eye, nose, uterus, stomach, etc., as the cause of the various reflex neuroses so frequently seen. While no one organ dominates all neuroses, careful observation has given us a useful catalogue of reflexes emanating frequently and positively from certain organs and ascribable thereto.

The last aspirant for honors in the field as a cause of reflex neuroses is the tooth. That it can vindicate its title I think can easily be proved by many careful observers. The dental organs are far-reaching in their influence through their intimate and extensive nervous connection through the fifth nerve, and thus with the eye, ear, nose and throat as their organs of most frequent attack.

Many observers have published records of affections of the eye attributed to decaying or decayed teeth. The most frequently observed and reported cases are those of inflammation of the conjunctiva—of the pustular or phlyctenular type. These cases are seen daily in our dispensary clinics, and in many instances have I observed the association of decayed teeth or difficult dentition. While the teeth are not the sole cause of the trouble, one can frequently—as I often have done—expedite the relief by careful attention to the teeth in conjunction with proper dietetic, hygienic and medicinal treatment. Again, in certain inflammations of the cornea (keratitis), carious, irritable teeth are frequently associated.

The Hutchinson (syphilitic) teeth are usually associated with corneal inflammations of luetic origin. My invariable rule in seeing an inflammation of the cornea in a cachectic youth or adult is to look at the teeth for manifestations or verification of my suspicions of the constitutional taint. As dentists you can ever bear in mind in these cases with characteristic Hutchinson teeth to look for evidence of past corneal inflammation manifested by the ground-glass appearance of the cornea. If no past evidence is seen, make a prophecy (to yourself, of course) of some future eye trouble. Bear in mind, however, that the teeth are not the cause of the eye disorder, nor *vice versa,* but that a common underlying cause (inherited syphilis) prevails.

Amblyopia (partial loss of vision) in varying degrees has been recorded by Hutchinson Gill (1872), Samelsohn (1877), and Bull (*International Dental Journal,* March, 1898). Of such I have had no experience.

Optic neuritis from dental disease has frequently been recorded, however. Such cases are usually secondary to orbital periostitis or cellulitis following suppuration in the antrum. Every one of you has seen antral suppuration of dental origin and doubtless involvment of the other sinuses, including ethmoid, frontal and sphenoidal. That such an indirect cause can be a cause of optic neuritis is

readily understood when you take into consideration the proximity of the optic nerve to the diseased sinuses.

The most frequent ocular disturbance seen in connection with dental irritation is that of accommodative weakness. This, again, is due to the common nerve supply. The ciliary nerve supplies the ciliary muscle—the muscle of accommodation—being a branch of the fifth nerve. Schmidt has published (*Arch. f. Ophthalomol.*) a series of 92 cases; he found limitation of accommodation in 73. The condition was most frequent in young individuals. The opposite of this—spasm of accommodation—has also been noted in cases of disease of the teeth. My own experience, while not so large, confirms the frequent association of irritability in the use of the eyes for near work (in accommodation) where defective, painful teeth are present, and hence the appeal for glasses and an examination, when no defect or refraction has been found, the sole cause residing in the irritability of the ciliary muscles due to diseased teeth. My advice to such patients is, "Consult your dentist." Baumeister has related a case of complete paralysis of the muscles of the eyes due to dental caries. This, however, may be attributed to periostitis of the sphenoidal fissure, possibly from infection from a decayed tooth.

To illustrate how vigilant we should be in our endeavors to find the cause of disease—and thus the cure—the following case from my note-book is interesting: An adult consulted me in 1898 for an irregularity of pupils—the left being dilated—the history being that for some time off and on he would notice the variability in the size of pupils with no other disturbance. Vision good, but the appearance was objectionable. On examination I could find no cause for the trouble—systemic or local. He had not been using mydriatics or drugs. The pupils would contract with eserin, and resume dilatation upon its withdrawal. There was no error of refraction. No relief was obtained from any measure until two decayed teeth on same side were treated.

Zonular cataract (congenital cataract) is frequently accompanied by dental defects, the cuspids and incisors being marked by transverse lines, furrows and terraces. This is merely an association due to common constitutional causes, no relationship existing between them.

Dental irritation in its effect upon the ear in producing and in

modifying the course of ear diseases has excited and is exciting much interest and investigation among the most progressive aurists. Yet many otologists and practitioners do not give the subject the attention it deserves, nor are they duly impressed with the importance of dental irritation in the causation and treatment of ear diseases. Observing the close sympathetic nervous relation which exists between the ears and the mouth and teeth, one readily understands that irritation from the teeth can be a source of disturbance to the organs of hearing. It is extremely difficult to convey a due appreciation of or even to rightly account for general nervous manifestations due to dental irritation, even though slight locally. That dentition, especially the eruption of the third molars, the presence of decayed or diseased teeth, the wearing of badly fitting dentures, etc., should frequently excite reflex trouble in the organs of hearing is easy of explanation when we consider the close anatomical relationship through their nervous connections. Reflex irritations are daily seen by aurists in irritation of the ears in various ways, such as the introduction of specular applicators, etc., to the external auditory canal, giving rise to sneezing, coughing, or a desire to swallow. Sexton in 1880 and 1888, and Burnett in 1884, published elaborate articles on the effects of oral irritation on the ear.

The importance of recognizing early irritation from teething as a cause of earache in infants cannot be over-emphasized, affording a means of speedy relief by incision of the gums before congestion and its sequela, suppuration, supervenes, with its grave dangers to hearing and to life.

To rightly appreciate aural disturbances due to diseases of the teeth and gums, it will be well to review briefly the nervous relationship between the ears and the nose, mouth and pharynx. The nervous mechanism of the tympanum—known as the tympanic plexus—is connected with that of the mouth, nose and throat through branches arising chiefly from the otic, petrosal and Meckel's (spheno-palatine) ganglia. The inferior maxillary or third division of the fifth pair is connected with the plexus through the otic ganglia. The tympanic or Jacobson's nerve arises from the petrosal ganglion of the glosso-pharyngeal nerve. The superior maxillary or second division of the fifth pair is connected with the tympanic plexus by the vidian nerve through the spheno-palatine ganglion (Meckel's). The carotid plexus of the sympathetic is also con-

nected with the glosso-pharyngeal by the tympanic branches of Jacobson's nerve. Thus we see how the nervous communication between the ear and the superior cervical sympathetic ganglion is established; other minor connections exist, but this review suffices for our purpose of showing how the teeth, palate and mucous membrane of the oral, nasal and pharyngeal cavities are brought into relationship with the drumhead, the tympanic cavity and its contents, and the external auditory canal.

Chronic or long-standing irritation in one part of the mechanism can and will ultimately manifest itself in reflex irritation elsewhere, causing nutritive or trophic changes therein. The tympanic cavity, owing to its rich blood and nerve supply, is peculiarly adapted to such changes, especially in those of low vitality.

Your experience will corroborate mine in stating that sympathetic aural disturbance is liable to occur during first dentition, beginning with the eruption of the incisors to its completion at the end of the second year, and later from the presence of remains of the deciduous teeth until their removal or absorption. In such cases examination of the ear will show more or less reddened drum membranes accompanied frequently by a purulent process to be followed by more or less deafness. My case-book contains pages of such a picture. Second dentition in all its phases, from the beginning about the fifth to the seventh year, and the eruption of the first molars, to the eruption of the third molars at or about maturity, is frequently accompanied by aural irritation, made more susceptible by the strenuous life of the schoolroom. The eruption of the third molars may cause much general disturbance and be accompanied by suppuration of the middle ear in conjunction with tonsilitis, pharyngitis and abscess of the gums. These cases are familiar to all of you.

Much has been written and said in reference to the casual relationship between dental irritation and chronic catarrhal non-suppurative inflammation of the middle ear, the most frequently observed cause of deafness. The cause of middle-ear catarrh is very obscure, and every case should be examined as to the condition of the teeth, bearing in mind that long-continued reflex irritation from diseased teeth may be a potent factor in its production.

Sexton in a review of eighteen hundred cases of ear disease found that one-third of them originated in or were more or less prolonged by a diseased condition of the teeth, the male sex somewhat in excess

of the female. In both sexes the greater number were affected between the twenty-first and fortieth years. The chronic ear affections greatly exceeded the acute forms.

Aside from decayed or otherwise neglected teeth, as a cause of aural irritation, how frequently do we find the artificial measures —plates, fillings, bridges, etc.—to be the exciting causes. Badly fitting plates, bridges, broken but painless teeth, cavities imperfectly cleansed of decayed matter bearing fillings—all are sources of pain and irritation. Artificial plates, badly fitting or of injurious material, worn over decayed roots and inflamed gums, or worn day and night without cleansing, increase any irritation already existing.

In this place permit me to report briefly an interesting and instructive case seen August 26, 1902: *Case of J. W. B.* Male, aged forty-eight. Complained of pain in left ear, on swallowing, for past ten days. Could not open the mouth or protrude the tongue without excruciating pain in the ear. Examination revealed a normal drum and hearing. No evidence of inflammatory trouble. On examination of the oral cavity a slight excoriation of left side of tongue was noticed, and on friction with cotton-tipped applicator pain in the ear could be elicited. One of his lower molar teeth was roughened on the edge, which I advised should be smoothed, and I dismissed him with an antiseptic wash and potassium iodid internally, suspecting a possible mucous patch, although no specific history could be obtained. I saw him at intervals of two or three days and had him increase the iodid rapidly, with no improvement but rather an increase of the thickened excoriated surface on his tongue border. On the 13th of September—two weeks after seeing him for the first time—I suggested to him the grave possibility of its being an epithelioma or cancer of the tongue, and advised him accordingly. He was dismissed to return three days later and no improvement noticed. I told him I could not be responsible for the final result unless he consented to have a consultation or its removal. I had him see my friend, Professor Chambers, who gave him the same opinion and advised operation. He consented, and the operation (removal of a portion of the tongue) was done one week later, with cessation of all phenomena and retention of a fair speaking voice. This case shows the grave conditions likely to follow irritation from diseased teeth as well as reflex phenomena in organs more distantly located, as in

this case, his sole cause for consulting me being for pain in the ear, never suspecting any trouble in his mouth or teeth.

Enough has been said to call your attention to dental irritation as a frequent cause of aural affections. The painful results of dead or diseased teeth in the mouth cannot be overestimated. The ear, being kept in a chronic state of hyperemia, is much less able to withstand the effects of exposure and other catarrhal influences. This interesting subject could be elaborated in greater detail, but I have said enough at least to direct your attention to the remote effects of disease of the organs you treat.

Before I conclude permit me to say a word in reference to a phase of our work which has a mutual bearing, although possibly not directly of reflex origin—the influence of nasal and naso-pharyngeal obstruction upon development of the teeth and palate, and the detrimental effects of mouth-breathing due to these causes, the most frequent of which are adenoid growths in the naso-pharynx. These growths take precedence both in frequency and consequence. Among the sequels of neglected adenoids are high-arched palate and irregular teeth. We have two varieties of deformities, depending upon whether the adenoids were present before or after the second dentition. If before, the palate becomes higher and distinctly dome-shaped, the alveolar process forms an ellipse, the lateral portions approach the median line, the whole growth of the maxilla is retarded, but the teeth are in the normal position. If after the second dentition the adenoids are still present, the alveolar approximation is still more marked, the palate more elevated, approaching the Gothic type of arch, the anterior part of the alveolus inclines forward, and the jaw assumes the V-shaped form so frequently seen. These changes result in certain alterations of the teeth. The central incisors are so rotated that their lingual surfaces look toward each other. The lateral incisors and frequently the bicuspids are pushed inward while the molars turn outward, the maxilla and mandible do not develop at the same rate and the normal articulation is interfered with. That these conditions are due to nasal obstruction there can be no doubt. This is proved by both clinical observation and by the experiments of Ziem, who produced the same changes in young animals by blocking their nasal chambers with cotton-wool. When but one side was occluded the changes produced were obvious.

There was a general arrest of development of the maxilla, the palate and frontal bones, the ear, and the whole side of the face.

One explanation is that normal descent of the palate is interfered with by the adenoids which interfere with the general development of the child. The sphenoid and the septum fail to develop, while the alveolar process and the face in general grow at the usual rate. Another theory is based on the fact that in mouth-breathers the tongue is not in contact with the maxilla and there is no internal force to counteract the inward pressure of the cheek. As a result the jaw is narrowed and lengthened. During the change from the temporary to the permanent dentition the great vascularity of the maxilla causes softening which allows the marked changes that occur at this time. Another explanation is that as the air passes through the mouth there is negative pressure on the palate and consequently it is drawn upward. Doubtless all these factors are at work, as well as the trophic nerves. Thus is seen the importance of an early recognition of obstructed nasal respiration in order that one may give the proper advice to the fond parent in reference to the removal of the adenoids.

Here again, then, is evidence of the interdependence of all specialties in medicine, rendering a mutual aid society of all specialists necessary if we would do the best for society and humanity and win the gratitude of our suffering humankind. The specialist who is of the narrow-gauge type, who lives within his limited horizon—be it confined to the teeth, eye, ear, nose, throat, urethra, rectum, or uterus—cannot do full justice to his calling or his patients. He will frequently find patients whom he has doped, purged, and dieted world without end, and with no relief, take the matter in their own hands and consult someone with broader views of the causation, prevention, and treatment of diseases.—*Cosmos.*

PORCELAIN AND ITS POSSIBILITIES. By D. O. M. Le Cron, D.D.S., St. Louis. Read before the St. Louis Dental Society. During the last fourteen years I have devoted much time to this class of work, experimenting with the different porcelain bodies and furnaces that gradually were put on the market. I will not take up your time telling how the various crowns should be made, bridges constructed, inlays formed or continuous-gum dentures baked, as I could only reiterate what others have said. Suffice it

to say that this work can and has been done successfully in competent hands. To reach the highest point of success and be masters of the situation we must be master mechanics to construct our abutments and framework to receive the porcelain body. Learn to manipulate the porcelain to retain its form; ascertain the true fusion by experimenting; calculate on the shrinkage, to maintain its outline; a thorough knowledge of the furnace; and last but not least, a good eye to blend the colors. This can be accomplished only by repeated experiments and a determined effort on our part to master the situation. To those of the profession who are merely looking on the "filthy lucre" side and throw their work together in a slip-shod manner, not caring for the artistic or natural appearances and aiming only to get the work off their hands, I would say *keep hands off*, for you will surely lose what little reputation you might chance to have. All can learn the art if they have the perseverance and that ambition to be in the front rank. We that have passed through our experimental stage can aid you and shorten your road if you only get down to work and try to master the art. Many little details are connected with porcelain work, some in an indirect way. To the beginner I would suggest, get your furnace, test it and become familiar with same. It is simple: 28 to 30 gauge pure platinum wire wound inside the muffle, covered with pure fire clay. The nearer the wire is imbedded to the inside surface of the muffle the better it produces the required amount of heat; also to produce an excess of heat the wire should be wound closer, and the smaller the wire for same purpose the better, on account of it having a greater resistance. To produce uniform heat throughout the furnace the ends of the muffle should be coiled closer than the center, on account of radiation of heat accumulating in the center. A rheostat should be connected to regulate the heat and the safety of your furnace. No pliers or any kind of metallic instruments should be used in the muffle when the current is on and at a high heat, as you are liable to have a short circuit.

The little appliances to the furnace for supporting the work you can make yourself. Get some pure fire clay and make your moulds for the design intended. I would suggest passing a strong magnet through your clay before mixing it with water, as all fire clay

contains more or less iron, and it should be as free from iron as possible. Work your clay thoroughly, oil your mold, press your clay in mold and absorb the moisture, then by a little jarring of the mold the clay will drop out. When thoroughly dry you can burn it in your furnace. This may seem to many of you too much trouble, but I wish to say that in handling the clay you learn to manipulate porcelain at the same time. You can turn up or mold any kind of small retorts or crucibles that may be desired. I have here a small crucible that I made to fuse the Jenkins' body. With this you can experiment or can make inlays by using Jenkins' body. Any blowpipe or Bunsen burner will fuse it, as it only requires 1580° Fahrenheit to flow it.

I cannot refrain from mentioning that my experience with the low-fusing bodies has not been satisfactory. I consider that it is impracticable to attempt contour filling with an inlay body that will not stand up as carved under a high heat. Low-fusing bodies have a tendency to assume a globular form when fused frequently. Then, taking into consideration the great percentage of shrinkage —33 and more per cent—it is useless to waste words in regard to its usefulness, when we have good high-fusing bodies at our command in which we do not have those objections to contend with. Suffice it to say that our best porcelain workers in this country advocate and use high-fusing porcelain bodies.

The technique of carving and placing your colors in all porcelain work must be studied to bring out an artistic and finished piece of work. It is a good idea to experiment with porcelain on a glass slab. Mix up a batch of porcelain and learn to carve some kind of a tooth, and continue to do so until you are satisfied you have attained that proficiency that will enable you to produce any shaped tooth. Your next step will be to bring out the natural shades of the teeth by adding the different colors in layers and studying the effect one color has on another. Examine closely the underlying colors in the natural teeth. It will surprise you what a variety of colors you can find. It may take some practice to detect the colors, but close observation will develop your eye to perceive them, and just as you can see these colors and then produce them your work will be finished accordingly. To produce these colors requires much experience. It is not to be learned by

reading. Anyone wishing to become proficient must get it by constant experience. Unlimited shades can be produced by changing the proportions of color, and the proper blending produces natural effects. The inexperienced cannot expect to produce good results with his first attempt, and I do not believe it can be learned except by experiment, as I consider it the most difficult problem in porcelain work. Charles Martel says: "The source of color is light, which is either a natural or artificial. Natural light derived from the sun is termed *white* or solar light. Artificial light is obtained from burning bodies, and is generally colored." Colors are distinguished by artists as pure, broken, reduced and gray or dull. The pure colors comprise those which are called *primary* (red, yellow and blue), and those which result from their compounds, *secondaries* (orange, violet, green and their hues, such as violet, red-orange, orange-yellow, green-blue, etc.). The three primary colors, red, yellow and blue, are the source of all other colors derived by mixture. If you mix blue with yellow, green is produced; blue with red yields a violet; red mixed with yellow, you get an orange, etc.; a gray can be produced by equal proportions of red, blue and yellow; with white and black you can produce any shade of gray, according to proportions mixed. The causes of the peculiar colors of different substances are usually accounted for by saying that all bodies *absorb* certain colors and reflect others, the color absorbed being always complementary to that reflected. Thus, if a body is green it will absorb or take up the red rays and reflect blue and yellow, and so on with the other colors. It would be difficult to lay down a rule to master this shade problem, and I will not attempt it. My experience has taught me that the only method to pursue to become expert in the shade problem is to get down and work and experiment until you master it.

I want to make a few remarks on gum enamels. I think all of you who have had any experience with the gum enamels which are put on the market by the manufacturers will agree with me that they produce an unnatural pinkish gum, and as a rule very unsatisfactory results are obtained by same. I have experimented quite a little along that line, and am safe in saying that I can produce a gum enamel that will be a perfect imitation of any natural gum with which you come in contact. It is also the *shade* problem—the results obtained by combining several gum enamels of

different manufacturers in certain proportion with small quantities of White's inlay body. A little experience will teach you the proper proportion to mix to get perfect results.

We will next take up the fusion of porcelain. It is of the utmost value to learn the true baking or fusion point. If underbaked it will be brittle, flake off and not withstand the force of mastication. In overbaking you produce porosity and extreme weakness, and your work is a total failure. The question is asked how to arrive at true fusion. Some say "the eye can detect it;" others, "pure gold and a certain time after it melts;" while a few advocate "a given time for the furnace to run." To the first I will answer that it is impossible to detect the true fusion with the eye. When your furnace assumes the orange color of heat, 2100° Fahrenheit, an eagle's eye will not determine it correctly. As for the second method, with the melting-point of pure gold as a guide, you know you have 2016° Fahrenheit; but above that, say 3000° Fahrenheit, you are obliged to approximate your heat, and your electric current will vary. The third method is likewise susceptible to variations of your current. I have used a thermometer placed in a fire clay bulb with a heavy platinum wire extending into the furnace, but fluctuations in the temperature of the room varied so that I was compelled to abandon it. I have used the mouth-mirror to reflect the light; also used Custer's arc light. I found both were good until they reached about 2100° Fahrenheit. The furnace then assumes the orange color, and the higher you go the brighter it becomes and it gradually reaches a white heat, so that it is impossible to detect a true fusion. I used pure gold to detect a given degree of heat, and then timed my furnace accordingly, with good results, judging the time required for the proper fusion by the color of the furnace.

Three years ago I had occasion to get some fire clay from one of our brick manufacturers to make a number of small retorts and crucibles for some of my experiments. Upon inquiry I learned they used Seger cones, set in series, as guards to ascertain the heat of their kilns. I concluded these cones would be a great aid in securing the correct fusion with the furnace, and I procured a number ranging in heat fusion from 1000° to 2800° Fahrenheit. After many trials (baking a certain body and crushing the same until I got the greatest possible strength), making a note of the

number of Seger cones and of crushing strength, I was positive of the true and proper fusion of the various bodies on the market. In August, 1902, I concluded to ascertain the fusion points with Le Chatelier's thermo-electric pyrometer, using the Seger cones as guards. The principle upon which this pyrometer is constructed is the measurement of a current of electricity produced by heating a couple composed of two wires, one of platinum and the other platinum with 10% rhodium, the current produced being measured by a galvanometer. In preparing the test pieces I bored a tubing .310 of an inch in diameter, and turned a plunger for same, making it .180 of an inch shorter than the tubing. The body was mixed with distilled water to a stiff creamy consistency, packed in the tube with pressure, and the excess of moisture absorbed with blotting-paper. By this method I was assured of thorough packing and uniform size of all pieces—.310 of an inch in diameter and .180 of an inch thick. Each button was allowed to dry thoroughly before placing in furnace. I give you the results as follows:

	Degrees F.
Allen's porcelain body	2340
Close's porcelain body	2288
White's inlay porcelain body	2254
Brewster's foundation body	2218
Consolidated continuous-gum body	2200
Consolidated inlay body	2138
Whitely's body	2138
Brewster's enamel body	2084
Ash high-fusing body	2012
Jenkins' body	1580

I will leave you to judge of the correctness of these temperatures, but I am satisfied in my own mind that they are absolutely correct, for the most minute attention was given to every little detail. Experiments will show that correct fusing of porcelain, if you wish to reach the highest point of strength, is absolutely necessary; and I may add that much of your success in this line of work depends on your knowledge of the same. Temperatures can also be judged by color; a body can be approximately ascertained

by an experienced eye. The following table, compiled by Kent, gives the colors and their corresponding temperatures:

	Degrees F.
Red in the dark	752
Red in twilight	884
Red visible by day	1077
Dull red heat	1292
Dull cherry red	1472
Cherry red heat	1652
Bright cherry red	1832
Dull orange heat	2021
Bright orange heat	2192
White heat	2372
Bright white heat	2552
Dazzling white heat	2732
Dazzling white-purple heat	2920

These results obtained, however, are rather unsatisfactory, as much depends on the susceptibility of the eye of the observer to light; also the degree of illumination under which the observation is made. You will note by experimenting in daylight, twilight and darkness that the colors vary several hundred degrees. By constantly noting these colors in your furnace you can in time at least approximately detect the temperatures, and may at times save yourself trouble when by accident you neglect the furnace.

Shrinkage.—I will next submit a table of the percentage of shrinkage of the different porcelain bodies, to aid at least the beginner. This, I assure you, plays an important part in the manipulation of the body. In applying the body—it matters not if it be for continuous gum, bridge, crown or inlay—you must make your calculations for a certain percentage of shrinkage, according to the body used. With extensive pieces of work I make separation complete at various points, particularly between the facings on teeth, that my work may not be warped or twisted out of line. With inlays it is necessary to divide the porcelain or carve it in such a manner that it will not shrink from the matrix nor warp the same. Shrinkage always must be taken into consideration and allowances made to retain the matrix or framework in the same relative position you get it from the cavity or abutments. Porce-

lain always shrinks towards its greatest bulk, and the danger of contraction must be overcome by separation, making a cross or hole in center of body, according to pieces of work in hand.

There are three stages of shrinkage in all porcelain: (1) The evaporation of moisture; (2) the small particles of porcelain closing in as fusion commences; (3) as it becomes vitrified. In preparing the buttons for the tests all the details in manipulating the porcelain were scrupulously carried out to exactness. The measurements were taken with a micrometer calipers measuring .001 of an inch, and calculations made accordingly. To be positive as to the correctness, I baked three buttons of each body, took their measurement, and found a variation of only one-half of one per cent in the best bodies. The appended table will show the percentage of shrinkage, as follows:

Names of Porcelain.	Percentages of shrinkage.
Allen's body	22½
Close's body	21¾
White's inlay body	23½
Brewster's foundation body	23¾
Consolidated continuous gum	21½
Consolidated inlay body	31
Whitely's body	31
Brewster's enamel body	33
Ash's high-fusing body	34¾
Jenkins' body	38¼

You will note the above table presents quite a variation in shrinkage. In all the high-fusing bodies the percentage is much less than in the low-fusing. It is evident that the bodies having the shrinkage of 33 or more per cent must be worked with the utmost care. The tendency also to globulate in shrinkage necessitates careful addition to previous baking.

Crushing Strength.—To satisfy myself and settle in my mind at least the great diversity of opinion concerning the relative strength of the different kinds of porcelain on the market, I have made impartial and exhaustive tests as to their relative strength. Each manufacturer makes special claims for the porcelain which he places on the market, and it is no easy matter for the beginner to select. Many even that are considered experienced are led to think as the manufacturer tells them, and work and pass their judgment

accordingly. It is of the most vital importance to have the greatest amount of strength that porcelain can possess to reach the limit of success in crowns, bridgework or continuous-gum work, and likewise in all contours of inlay work. In making these tests I used all precaution in manipulation, and I assure you I give the results obtained in all fairness, and have satisfied myself beyond a doubt concerning their relative strength and worth.

The molds were prepared, measuring .428 of an inch in diameter and .263 of an inch in depth, making a button after baking about the size of a medium-sized molar. The same method of manipulating the different porcelain bodies as stated before was employed, using the Seger cones to ascertain the fusion. I will give you only the greatest strength we obtained. To be positive and not to be misled, I baked from four to six buttons of each porcelain body and labeled same. I also underbaked and overbaked, as I will show you later, to emphasize the importance of true fusion. These tests were made by the St. Louis Testing Company and the Washington University Testing Laboratory on a Reihl testing machine. The porcelain buttons tested for crushing strength and the results obtained are stated in the following table:

Names of Porcelain.	Breaking Load, in Pounds.	Crushing Strength, Lbs. per sq. inch.
Allen's body	3,450	26,950
Close's body	5,650	45,640
White's inlay body	3,800	32,205
Brewster's foundation body	2,540	20,320
Consolidated con. gum	3,860	30,390
Whitely's body	2,110	16,000
Brewster's enamel body	2,690	22,990
Ash's high-fusing body	2,660	22,810
Jenkins' body	3,330	28,305
Consolidated inlay	2,100	15,080

It was noticeable that the buttons which required a larger load for their crushing-point to be reached broke into finer powder than those requiring the lighter loads. All of the buttons which crushed at greater than 2,700 pounds chipped more or less when a load approximately of 2,000 pounds was reached. As the different buttons varied considerably on account of shrinkage, the last column

in the table, headed "crushing strength, in pounds per square inch," gives the truer comparison between the strength of the various buttons. In the above table the figures given are the best results I obtained with each of the named bodies, and I attribute the high crushing strength to the fusion of the porcelain. By repeating my experiments I found that Close's and White's inlay bodies were more uniform in crushing when fused at their normal fusion than any of the other bodies; they only varied some 90 pounds in crushing. The same bodies, Close's and White's, when underbaked (36° Fahrenheit) gave way at from 300 to 500 pounds less weight, while overfusing (72° F.) gave way at from 1,600 to 2,300 pounds less weight than that at the proper fusion point. The Jenkins' body stood its highest test at 1,580° F. (3,330 pounds); at the temperature of 1,544° F., 2,910 pounds, and crushed at 1,090 pounds at 1,616° F.

It is evident in my mind that many failures in porcelain work can be attributed to improper baking and particularly to *over*-baking. If your framework is properly constructed on mechanical principles, and you get the correct fusion, I assure you that porcelain has the strength to stand more than ordinary mastication.

I will say in passing that from clinical experience I prefer Close's body for continuous-gum and foundation for large pieces of work, and White's inlay body for all general work, on account of their great strength, less percentage of shrinkage, perfect density, retaining their color, and that they maintain the sharp outlines as carved; all of which is very essential in porcelain work, for absolute exactness in every detail must be carried out to be successful. The least failure in any part of the process will end with an imperfect piece of work.

Experience has fully demonstrated to me that only high-fusing bodies are suitable for continuous-gum, crown and bridgework; and I assure you they possess all the requirements for inlay work, on account of less shrinkage, retaining the outline as carved, and the color after being fired. To meet all requirements, porcelain should possess the greatest possible strength and the smallest amount of shrinkage. It must have that quality of retaining finely carved outlines under great heat. The fusion point should be sufficiently high so the attachments to high-grade porcelain teeth become permanently secured.—*Era.*

INFLUENCE OF THE ANATOMICAL DISPOSITIONS IN THE PROGRESS OF DENTAL ABSCESSES. By Dr. Dalban. Dental abscesses may be divided into two great classes: those which develop in the interior of the buccal cavity, and those which occur without—that is to say, cutaneous abscesses. Among the former the vestibular abscesses are the most frequent; moreover, they form the majority of abscesses having a dental origin.

It has appeared of interest to us to seek out the causes which favor these two localizations of pus, either in the gingivo-labial furrow or in the skin; for even if the vestibular abscesses often develop without much injury, it is not so in regard to cutaneous abscesses, which, with their distant fistulous tracts in the cervical, thoracic or cerebral regions, must be credited with fatal symptoms.

This predominance of the vestibular abscesses has not existed without striking observers, and different reasons have been given to explain it. The influence of the weight, which would favor in the mandible the formation of cutaneous abscesses, has been mentioned, the pus by its own weight having a tendency to develop under the gingivo-labial furrow. This reason is not exact. One often observes, in fact, dental abscesses taking an ascending direction, progressing from below upwards far from the initial hearth. In the economy, moreover, this fact is not rare, and we observe voluminous purulent collections which do not in the least obey the laws of weight in their evolution.

It has also been wrongly supposed that, following the localization of periostitis at the apex or upon the sides of the root, we have either a cutaneous opening or a gingival opening. Thus there is no lateral periostitis without periostitis of the apex, except in pyorrhea, and yet this affection is not one which engenders dental abscesses most often. In periostitis—a complication of the fourth degree of caries—the infection having followed the apical direction, the periosteum becomes inflamed at this level, and from there reaches the lateral portions; but the maximum of infection and of the intensity of the phenomena will always be found at the apex of the root.

One might more truly name the difference in the thickness of the maxillæ in their alveolar portion, permitting their perforation at the weakest point. Most often this perforation occurs at the level of the radicular extremity, the point of departure for the alveolar infection.

The chief reason given by all the authors is the difference of length between the roots and the gingivo-labial furrow; the roots shorter than the furrow would produce gingival abscesses, and the longer roots cutaneous abscesses. Thus, as the roots are normally shorter than the furrow, is explained the frequency of vestibular abscesses.

This delusive reason ought not to be admittted, except it be completed by the following, which to our notion ought to dominate all the others. The opening of the abscess either on the gum or in the skin is determined by the connection of the radicular extremities with the muscular insertions of the alveolar edge. Thus the muscles of the cheek enter the maxillæ nearly at the level of the bottom of the gingivo-labial furrow. Hence one has been able to say that the difference in length between the furrow and the roots played the chief part in the progress of the pus, but in reality this *róle* is only apparent.

The muscular influence is quite natural. Indeed, it is a rule in general pathology that the pus in its evolution follows the muscular and aponeurotic directions; it cannot be otherwise in regard to dental abscesses. The alveolar edges are furnished with a series of muscular insertions, among which those of the buccinator are the most important. The osseous insertions of this muscle are found at the level of the three molars and the two premolars. The buccinator is reinforced by other muscles, whose insertions, although more distant from the alveolar edge, have nevertheless an influence upon the progress of the pus. In the mandible they are the osseous attachments of the masseter muscles, the triangular lip and square chin muscles. In the maxilla they are the cuspid, myrtiform, the two elevator and the two zygomatic muscles.

If the extremities of the roots are situated upon a higher plane than these muscular insertions (we are speaking at the present moment of the maxilla) the abscess will develop perforce outside the buccal cavity, the muscles forming a barrier between the pus and the mouth. On the contrary, if the radicular extremities are under the insertions the abscess will be gingival and will develop in the vestibule.

If we only admit, as an influence upon the progress of the pus, the difference of length between the roots and the furrow, in the cases of roots longer than the furrow the abscess ought always to develop

in the skin. This is not so, and we have found exceptions on many occasions. The fact is that the muscular insertions of the alveolar edge do not correspond with the bottom of the furrow, and a root longer than the furrow may nevertheless have its radicular extremity under the insertion of the buccinator—for example, in the maxilla.

Another fact also goes to prove that the muscular dispositions have a primordial and almost exclusive influence upon the progress of the pus. We have carried out a series of measurements of gingivo-labial furrows. We have taken averages, given minimum and maximum lengths, and by comparing these lengths with those of the roots of the teeth, according to Black's tables in his *Dental Anatomy,* we have arrived at the following conclusions—Normally the roots are shorter than the furrow, except in the mandible at the level of the molars. The three lower molars—the third above all—have their roots longer than the furrow. The gingivo-labial furrow is deeper in the maxilla than in the mandible. It attains its maximum at the level of the cuspids, its minimum at the level of the third molars.

Since the lower molars have their roots longer than the furrow at this level, all the abscesses which they might engender ought of necessity to develop in the skin. It is not so, however, and for the precise reason that the insertions of the buccinator are often on a plane notably lower than the bottom of the furrow. In the same way the frequency of cutaneous abscesses due to these teeth is likewise explained, the buccinator often forming a barrier between the pus and the buccal cavity.

This muscular influence is further demonstrated by the following consideration. The buccinator, the action of which is the most immediate, does not exercise its influence beyond the premolars, the point where its osseous insertion finishes. Further forward it is the other muscles described which act, the triangular lip and square chin muscle. Thus there exists a little space of two or three centimeters between the anterior edge of the masseter and the posterior edge of the triangular—a space where no insertion at all is found. At this level the pus, being no longer impeded in its evolution by a muscular barrier, is able to flow at large; where, on the contrary, a primitive abscess situated below the gingivo-labial furrow can nevertheless return to flow in the vestibule of the mouth, no barrier being between it and the buccal cavity.

The influence of the anatomical dispositions which we have described in regard to vestibular abscesses is equally applicable to abscesses developing from the side of the internal surfaces of the maxilla and the mandible.

Upon the internal surface of the mandible is found a powerful muscle stretched transversely, the mylo-hyoidean, which causes a very clear distinction between the abscesses which develop either over or under it. The former develop towards the floor of the mouth, the latter towards the sub-hyoidean region. If the pus contained in the alveolus perforates the latter above the mylo-hyoidean we shall have a sub-lingual abscess; if below, we get a sub-hyoidean abscess. These abscesses are relatively rare on account of the disposition of the roots and of the lesser thickness of the maxillæ outwardly.

In the palatine abscesses the pus does not obey the muscular dispositions, unless we are in the presence of an abscess on the soft palate. There, in fact, are found muscles in direct continuation with those of the pharynx, a region towards which the abscess will fistulate in quite a natural way. If we have before us—and this is frequently the case—an abscess developing in the palatine vault we find no muscles there, but a thick periosteum and a mucous membrane possessing a manifest influence upon the progress of the pus.

In fact, the periosteum, being very thick, adheres intimately to the osseous vault at the level of the alveolar arch, and much less upon the median line. The palatine mucous membrane also is very dense, and adheres to the bone by veritable fibrous processes (*prolongments*) which are attached to the rugosities of its surface. This adherence, which is very strong at the level of the alveolar edges, is much less so in the center of the vault at the raphe. Moreover, in the posterior two-thirds a thick glandular layer interposes between the mucous membrane and the periosteum. Through this it sometimes happens that abscesses, manifestly due to a lesion of an anterior tooth, appear posteriorly towards the molars or upon the median line, for at this level the periosteum and the mucous membrane, being much less adherent, allow themselves to become more easily separated. Moreover, the palatine periosteum is a very resistant membrane; the pus, before perforating it, loosens it to a great extent, and as the periosteum supplies the skeleton with its chief elements of nutrition, it

happens that necrosis not rarely occurs in consequence of an abscess in this region.

Certain teeth produce almost always palatine abscesses, the lateral incisor in particular. What is the cause of this special localization? We may seek the explanation of this by going back to the embryogenic formation of the maxilla and the evolution of this tooth. In fact, as is shown, the maxilla develops in five points of ossification, forming the malar, orbital, nasal, palatine and incisor pieces. Of all these pieces the four first become fused very early—at the end of the sixth month of intrauterine life—so as to constitute a single bone. The last, on the contrary—the incisor piece—is completely isolated in the embryo; it remains separated from the maxilla up to the fourth or fifth month of intrauterine life; at birth there remain still in most subjects evident traces of this suture, which in negroes persists even up to the second dentition. This incisor piece, in consequence of its late fusion, has been considered as a true isolated osseous piece, whence the name "intermaxillary bone" which has been given to it. This intermaxillary bone, one on either side, has been described by Albrecht as being formed of two pieces—one internal, the other external.

These two pieces then represent two sutures, but the external suture disappears rapidly and in such a manner that, taking for sole basis the internal suture, we have for a long time been able to describe a single piece as the incisor bone. Thus this internal suture terminates precisely at the level of the lateral incisor. It is the one which disappears last, as is proved pathologically by hare-lip, an affection due to the absence of the fusion of the intermaxillary bone. We distinguish two kinds of hare-lip—the median, due to the non-fusion of the two incisor bones between themselves and the lateral, due to the non-fusion of the two pieces, internal and external, constituting the incisor bone. The latter is more frequent than the former, precisely because the internal suture disappears last. Since the fusion between the two pieces constituting the incisor bone occurs last—since precisely the internal corresponds to the lateral incisor—may we not admit between this embryogenic consideration and the pathological fact of the palatine fistulas a relation of cause and effect? Is it not natural that the pus should escape by a way already traced, at the level of a weak point—a veritable fontanel? Do we not see in the skull the meningoceles, the encephaloceles,

stand out exteriorly through the sutures between the different bones? Let us add, also, that this intermaxillary suture is a great deal more distinct on the palatine surface than on the floor of the nasal fossæ.

If we now consider the lateral incisor in an adult maxilla we observe that its root is much less perceptible upon the external surface of the bone than the roots of the central incisor, and above all, of the cuspid. This deep situation therefore brings this tooth nearer to a palatine opening. This posterior position is perhaps due likewise to an embryogenic origin. We know that the permanent teeth develop from a germ of the primitive cord which has served to form the temporary teeth; thus this germ takes birth posteriorly, and the permanent teeth, once formed, find themselves placed at the posterior surface of the temporary teeth.

At the moment of the eruption of the permanent teeth the lateral incisors come only after the central incisors, which by their volume have already occupied a large portion of the space destined for the lateral incisors; moreover, when the lateral incisor makes its appearance the deciduous cuspid, which is shed late, is still in its place. Therefore the tooth is impeded from two sides at the same time; it is perhaps for this reason that it keeps this posterior direction, which, in consequence of the special disposition of the intermaxillary bone, further favors the formation of palatine fistulas in regard to this tooth.

Such are the divers influences which appear to exercise an action upon the progress of dental abscesses. It is the anatomical dispositions which play the chief part, in particular the situation of the muscular and aponeurotic planes of the region. It is they which guide the pus in its evolution, and which favor the formation of either vestibular, sublingual or cutaneous abscesses. In regard to palatine abscesses, the pus is guided by the special disposition of the mucous membrane and of the periosteum in this region.

ANATOMICAL LANDMARKS OF SPECIAL INTEREST TO THE DENTAL AND ORAL SURGEON. By Truman W. Brophy, M.D., D.D.S., Chicago. Read before the Section on Odontology and Stomatology, Fourteenth International Congress of Medicine, Madrid, April 23, 1903. The anatomical landmarks of the oral cavity have not received attention in a practical way such

as their importance demands. Every dentist almost daily necessarily deals with them, and should therefore keep in mind their relation to the operations which he is called upon to perform.

The superior maxilla.—Conspicuously to be observed in the superior maxillary bone may be seen the malar process. By continuity it reinforces the alveolar processes, thus fixing the upper first molar more firmly in its alveolus than any of its fellows, and consequently making the removal of its roots more difficult. It serves as a guide in the performance of operations for the removal of tumors and cysts, opening and treating the antrum, etc. The cuspid fossa practically has many interesting points to be considered. When the full complement of teeth is present and it becomes necessary to open the antrum in the treatment of empyema of that cavity, our attention is called to the fossa as the most accessible point of entrance. Having made an incision through the muco-periosteum transversely across the fossa and denuded the bone, we may by the use of the spear-shaped drill operated by the dental engine penetrate the thin anterior wall of the antrum, and afterward with a double-cutting bur enlarge the opening to the size desired to enable us to remove polypi, carious bone, foreign substances, etc., as conditions require.

Through the admirable work done in facial and cranial anatomy by my distinguished fellow countryman, Dr. M. H. Cryer, we have learned of many anomalies of the bones of the head and face which directly bear on surgical work in these regions. Anomalies are often embarrassing to the operator, as they cannot always be recognized until revealed while operating. It has been shown that we find the antrum—for example, the left one—so small in some cases, and the nasal cavity correspondingly large, that the usual procedure of opening the antrum through the cuspid fossa in such a case would surely result in making an opening not into the antrum but into the nasal passage. This would not only be an excusable error, but would be productive of no harm. Studying the anatomy we find that the antrum on one side may be unusually small while on the other it is of normal size. Moreover, the antrum is not infrequently divided into numerous cavities by bony walls which extend from above downward.

This fact is sometimes misleading in the treatment of empyema, as the operator may penetrate a healthy cavity while an adjoining one may be filled with pus. The only reliable course to pursue,

therefore, is to remove all bony substance so as to bring away all polypi, etc. Following the loss of the cuspid teeth, the deep groove and depression which invariably result along the alæ of the nose may be removed by the use of paraffin injected in a molten state into the muscular tissue beneath the grooves, thus lifting the depressed tissues and restoring the facial contour. By the use of paraffin injections we are now able to lift up depressed integument the result of wounds, and thus remove conspicuous facial deformities.

An anatomical point of interest to the dentist, and one which in a practical way is often a source of great annoyance to him and his patient who unfortunately has lost his natural teeth and who therefore must make use of artificial substitutes, is the origin and attachment of the buccinator muscles, as well as the muscles forming the floor of the mouth. The usefulness of artificial dentures is often very greatly impaired, and in some instances made valueless, by reason of the dentist's failing to keep in mind the origin, insertion, and function of these muscles. Many an artificial denture otherwise perfect in its construction has proved a failure in consequence of the dentist's not observing the action of these muscles. The wise course to pursue is to construct a temporary gutta-percha plate with teeth attached and allow the patient to wear it a few days, so that its behavior may be studied and such changes made in its form as the muscular bearings on it indicate. If the denture is to be made upon a metal plate the latter may be used instead of gutta-percha. It is in the aged particularly, in whose mouths the muscular attachments—by reason of the atrophy of the alveolar processes—are close to their borders, that the muscles lift the plates from their place.

Another anatomical point of interest to be considered in the adjustment of artificial dentures is the relation of the nerves which supply the parts upon which the artificial dentures rest. We have all of us heard complaints from patients who wear artificial dentures that they experience the same character of pain as is felt on exposure of a dental pulp. In the case of the upper denture this is due to the pressure of the plate upon the terminal branches of the palatine nerves as they emerge from the anterior palatine foramen. In the aged pressure attended with pain may be made back as far as the posterior palatine foramen. This difficulty may be overcome

by relieving the denture so that it will be impossible for pressure to be made over the foramen. In the lower jaw we find that late in life the mental foramen is very near the summit of the alveolar border, and as the inferior dental nerve emerges from it it is subject to the pressure of the plate, with pain as the natural sequence. To prevent pain the plate should be constructed after the fashion of a saddle, so that no pressure will be exerted upon the nerve as it passes out of the foramen.

The anatomy and physiology of the fifth pair of nerves, especially the second and third division, is of great importance to the dentist and oral surgeon, since facial neuralgia originating from diseased teeth and from other causes is often difficult of diagnosis and calls for the highest degree of skill in its management. I sincerely hope that the period in medical history will soon have passed when, in the treatment of cases of this character, for want of knowledge of the pathology of these parts the dental as well as the medical practitioner will resort to the reckless extraction of teeth.

Anatomical teaching of the innervation of the teeth has been, I believe, in description and illustration, by wax preparations and by models, in all countries erroneous and misleading. For example, the inferior dental canal contains the inferior dental artery and vein and the inferior dental or third division of the fifth nerve. The works on anatomy teach that branches are given off from the nerve and artery which pass directly upward to enter the foramina of the various tooth-roots, each root being supplied with a branch. It is true that branches are given off from the trunks as described, but they do not enter directly into the dental foramina, but are distributed to the cancellated bony tissue surrounding the roots of the teeth, and there dividing into many branches are distributed to the pericementum and in the form of a plexus distribute small branches to enter into the formation of the dental pulp. This anatomical arrangement explains to us an interesting sequel to surgical operations for the removal of the inferior dental nerve in the treatment of neuralgia. If the description of the distribution of dental branches were such as is universally taught, to remove the inferior dental nerve would be to destroy the pulps of all the teeth to which these branches are said to be distributed, but owing to the distribution being such as I have explained, we account for the continuance of the vitality of the pulps by the

anastomosis of branches from the sympathetic system, as the principal nerves of the digestive system, etc. In my earliest operations for the removal of the third division of the fifth nerve I believed, according to the teaching on this subject, that destruction of the pulps of all the teeth supplied by this branch would mean loss of their vitality, but much to my surprise I found a state of partial anesthesia follow the removal of the nerve, and within a brief period of time the teeth recovered normal sensation and were not injured in any way by the removal of the nerve trunk. Happily the usual teaching of this phase of anatomy is incorrect. We are able to remove necrotic bone around the roots of the teeth, and in case the membrane investing the apex of the root be preserved we are confident the vitality of the pulp will remain normal.

Surgical operations called for in the treatment of trigeminal neuralgia, preceded by careful, skilful diagnosis, require great delicacy of manipulation in order to obtain good results and avoid conspicuous cicatrices and other deformities of the mouth and face. It is customary for the general practitioner of surgery when operating on the maxillary bone, or in the performance of operations within the mouth that are of considerable magnitude, to make external incisions in order to gain access to and obtain a full view of the field of operation. I hold that these external incisions, followed as they are by the formation of scars, are wholly unnecessary in a large majority of the cases in which they are made. For example, a patient suffering from persistent neuralgia of the second and third divisions of the fifth pair of nerves, having undergone medication over a period of many months with only temporary relief, is taken by his physicians to a surgeon for diagnosis and treatment. The surgeon decides that a nerve lesion exists, and that an operation is required in order to cure the patient. The patient is prepared, the operation is proceeded with, and an external incision is made in accordance with the location of the lesion. If the affection be of the inferior dental nerve the incision is made along the border of the jaw, the tissues are reflected up so as to expose the external surface of the inferior maxillary bone, a hammer, mallet, and chisel are made use of, a section of the bone is removed so as to expose the inferior dental canal, and the nerve is extracted. A saw is sometimes employed instead of a chisel for the purpose of removing the external layer of bone covering the canal. The

wound is closed by suturing, and the patient is cared for antiseptically until it heals.

External incisions are wholly unnecessary in the performance of these operations. They may be successfully performed within the mouth by proceeding as follows: A small incision should be made downward from the mental foramen so that the canal may be entered with a silver probe, before which by the use of the bur the bone is cut down a little way so as to get access to the canal, then a drill after the form of Gates' dental root-canal drill exaggerated in size may be carried into the canal and the contents thoroughly removed. In order that the nerve may not redevelop, as it is inclined to do, the canal may be drilled out so as to freshen the surface of the bone, thus causing an exudate to take place from the freshened bony surface and consequent filling of the canal with bony tissue. Experience has taught us, however, that the canal does not always fill with osseous tissue, and the nerves may be reproduced in certain cases. I am of the opinion that there is no more reason for making an external incision for the removal of the inferior dental nerve within the substance of the maxillary bone than there would be to make an external incision through the cheek to gain access to the third molar tooth for the purpose of entering the pulp-chamber and removing the pulp.

Neuralgia of the second division of the fifth pair of nerves or the infraorbital nerve frequently requires surgical operation for its cure. It has been customary in performing these operations to make external incisions, for the purpose of entering the infraorbital foramen and making sections of the nerve. Easy access to the infraorbital foramen may be demonstrated by placing an instrument in the mouth, carrying it upward toward the orbit, placing a finger over the infraorbital ridge, when the instrument will be found to extend within a half-inch of the infraorbital foramen.

It may be readily seen that equally good results are obtainable by raising the cheek and making an incision over the cuspid. Dissecting up the soft parts, seizing the nerve with a tenaculum as it makes its exit from the infraorbital foramen, carefully dissecting out its branches distributed to the cheek, nose, and lip, then increasing the size of the infraorbital canal by means of a small drill, seizing the nerve, drawing it forward and dividing it, will ac-

complish the same end that is obtainable by making an external incision.

It is true that now and then we meet cases of such character as to make external incisions in operations upon the face a necessity, but I feel that every operator in considering the best interests of his patient, in all cases where it is possible to do so, ought to operate within the mouth, and thus avoid the formation of scars which will be a disfigurement to the patient through life.—*Cosmos.*

DRUG ASPECT OF LESIONS OF THE GUMS. By A. W. Harlan, A.M., M.D., D.D.S., Chicago. Read before the New Jersey State Dental Society, Asbury Park, July, 1903. I have felt a great reluctance in coming before you with such a subject—not that too much has been written about it, but because what has been written falls too far short of the mark, to comprehend the intelligent and logical application of drugs to and in the gums, and the administration of drugs internally that will have an effect on the gum tissue and adjacent mucous surfaces. When we look at the gums as they surround the teeth and cover their bony sockets we are led to think that the picture presented will always last; that the crescentic margins will never shrink, waste away, nor become the seat of disease. So soon, however, as the loss of a tooth, the lodgment of a piece of wooden toothpick between the teeth, the passage of a file or disc between them, or the application of a clamp, separator, wedge or any other tool that will injure the gingival margin has begun the initial destruction we are confronted with a lesion that if neglected may become irreparable. Let the possessor of perfect gums neglect to clean the teeth for a few days or weeks and there will be destruction of the gingival margin. Let him suffer from some malady that will confine him to his bed for a few weeks or months and the gums will show the effects of such illness. I need not dwell upon the many common causes of the beginning of destruction of the gums, for most of them are known to you. An abscess, a badly fitting clasp or plate attached to the teeth, the bands and bars of regulating appliances or ligatures, all have their effect upon the gums, and many of them leave their mark there for you or me to remedy as best we can.

Specific diseases and bad nutrition are chargeable with some defects of gum tissues. Tobacco and salivary deposits make their impress on the gums, and mouth breathing has a large part in distorting the teeth and disarranging them in their sockets. Any affection of the mucous membrane of the nose, mouth or pharynx that is more than transitory will affect the gums. Lack of personal care and of cleanliness of the teeth is responsible for many of the defects of gum tissue, and the injudicious use of toothpicks and ligatures or rubber bands will do much to make permanent injuries to the gums. All foreign bodies between the teeth and under the free margins of the gums are injurious, such as insoluble particles of ingredients of dentifrices. All washes and lotions and pastes and salves, having free acids or corrosive acids, by rendering the teeth sensitive, injure the gums, because then they are not well cleaned.

Evils of Prepared Food.—You may guess that there are many other agencies that do harm in some way to the gums, but one which has not been dwelt upon by any writer during the past ten years is the growing habit of feeding children and adults with finely comminuted prepared breakfast and luncheon foods, many of which are predigested and placed before the sufferer in such a form that they do not require mastication at all! Why are we endowed with thirty-two teeth if they are not to be used to bite, tear and chew food? The teeth need the exercise and the gums need the friction, and as we look at it now they get neither the one nor the other in this age of ready-to-eat foods, many of which are no doubt nutritious, but not needed by the great mass of men and women who must work and exercise other portions of the body. If we are to keep our teeth in number and form and health they must do their share of the work of the body to justify their place as organs. Foods and foodstuffs should be cooked or prepared in such a manner that they require mastication, and when eaten raw one of the pleasures of life is lost if they are bolted without mastication. You must realize that the gums are a part of the human economy, and you may take lessons from the lower animals, who eat slowly and carefully to insure perfect digestion. In order to have good, satisfactory masticating teeth the gums must receive friction from the food you eat or they should be rubbed in some manner to insure

perfect circulation and health. Teeth without gums are denuded teeth, and in many cases they are useless teeth. If you would save your patient much distress keep his gums in order, or show him how to do it. The teeth need their natural contour; if this is lost the gums suffer. This contouring of teeth must be applied in the making of crowns and bridges in order to protect the gums. A gum irritated or inflamed from lack of contour of the teeth will remain so, and even degenerate if the contour is not restored. I look upon the proper care of the gums from the personal standpoint as of as much importance as the care of the teeth themselves.

Lesions of the Gum.—A lesion of the gum may be local, a physical injury, or it may be pathologic. Many if not all the injuries will recover with little or no treatment, if they are superficial, or if the cause of the injury is removed quickly, as the cutting away of a protruding filling, the removal of any exciting cause of trouble between the teeth. A crown which is too long may cause serious trouble to the gums and sockets of teeth if not cut away, or even a large filling that does not occlude properly will cause much trouble; swelling of the gums and even death of the pulp have resulted from such cause. There is usually no drug aspect of the gums in purely local injuries, unless we include the application of an astringent, as zinc sulphate, lead water, boracic acid or one of the naphthol series in saturated solution. Most of the local hemorrhages are controlled by hot water, ferripyrin or adrenalin chlorid. Tannic acid, zinc acetate or alumnol could be used in such cases. When there is a suspicion of infection from a local injury 1 to 1,000 corrosive sublimate, hot, 105 degrees F., or argyrol or mercurol will suffice. In the absence of all of the above, first cleanse the surface with hot salt water and paint with carbolic acid 95 per cent, or treat the surface with 25 per cent trichloracetic acid. Give the patient fifteen-grain doses of soziodol, or four-grain doses of quinin bisulphate every hour in one ounce of spirits.

Any case of local infection of the gums or mucous membrane of the mouth must first be cleansed; second, disinfected with local applications, and third, given internal administration of a drug that will combat sepsis—salol, iodin compounds, boracic acid, mercury, the coal tar derivatives, such as the naphthol series. These cases gen-

erally are cared for by practitioners of medicine, but any dentist should know what to do and do it at once.

The lesions of the gums having a distinct drug aspect are those brought about through neglect or by the presence of organisms, usually pus-producing organisms. A lesion defined as accidental, local or pathologic will need to be treated as such. Some general diseases have their effect upon the gums, as scrofula, syphilis, ptomaine poisoning, continued fevers and the exanthemata. Filth, poor nutrition and faulty assimilation are chargeable with gum lesions. The drug aspect of general diseases is limited to the local use of sprays, washes and general cleansers. Boracic acid, peroxid of hydrogen, sublimate solutions, beta or hydronaphthol solutions, silver compounds, iodin, zinc, copper and strictly acid solutions, acetic, hydrochloric, trichloracetic, etc. The poorly nourished and those who do not assimilate need change of air, water and their general surroundings as much as they need internal tonics; sometimes, indeed, they get well without anything more than sea air or mountain breezes, with a change in diet and water. On several occasions I have sent my patients to French Lick Springs or West Baden, Indiana, and after ten days or two weeks found them much benefited by the use of the waters. In prescribing waters I find that drinking them is absolutely essential, as no benefit comes from the bathing alone. All cold waters simply give a shock and tone to the skin, and the heated waters by raising the temperature assist in eliminating poisons. None of the waters is absorbed to a degree sufficient to be considered as medicinal. Some excellent ideas on water may be found in Baruch's classic and in T. Sollman's work on Pharmacology.

The lesions of the gums requiring drugs are those proceeding from the apices of roots, the sides of roots, and the surfaces of the gums themselves. In the latter the treatment is very simple. If the gums are cleansed with peroxid of hydrogen and then painted with the compound tincture of iodin, two or three coats, so as to get a new surface, and the patient is fed on liquid or semi-liquid food for two or three days, the gums will become clean and free from redness, irritation or a tendency to bleed. If a discharge exudes from between the gum and the root of a tooth, usually there is some concretion on the root, which must be removed mechanically

or surgically, and the pouch or pocket cleansed or burned with some drug, as acetic, sulphuric, lactic, trichloracetic or citric acid in solutions in water of from 10 to 50 per cent. If the cutting and gouging have been well done, and the teeth are firmly lashed to each other or held by bands, and the medicine well injected in sufficient strength, Nature will have an opportunity to discharge all effete matter.

If the lesion proceeds from the apex it means a dead pulp, and anything from cinnamon water to 95 per cent carbolic acid could be used through the root to irrigate the fistula, and the root may be filled with your favorite root-filling: wood, bone, silk, oxychlorid, wax, gutta-percha, cotton, silver, copper or gold wire, salol or chalk. Abscesses do not heal to stay healed unless the end of the root is sealed. Sometimes it is necessary to amputate the portion of root necrosed before the lesion will disappear.

I am a strong believer in keeping the gum margin intact, therefore I do not favor the indiscriminate use of wooden toothpicks, floss silk or rubber bands. The patient who expects to keep his gums in order must have his teeth well contoured, they must occlude well. All crowns or bridges should be contoured on the portions that are attached to roots of teeth. The gums must be scoured and washed and massaged daily to prevent tendencies to bleed. If the teeth are sensitive to the air or to touch, magnesia, chalk, soda or lime must be used to counteract this. If the gum has been denuded from the neck of a tooth and the patient is still young enough—say under forty—you can coax it to grow and recover the root in part by great care, and stimulating it gently with iodin and zinc iodid and 10 per cent resorcin painted on it at intervals of one to two weeks. This is very tedious and requires much patience; these remedies must be alternated and changed about every six weeks. When you are trying to build gum tissue the patient must use a Badger brush and dentifrice composed of one part white castile soap and nine parts of precipitated chalk. Occasionally I add 20 grains of powdered quillai saponaria to a 10-ounce prescription. This may be perfumed with any oil and colored with carmin or cochineal.

Dentifrices and Mouth Washes.—The gums always do well when they are properly rubbed or massaged with water about 53 to 60 degrees F.; warm water is relaxing. Dentifrices are for the teeth, not the gums. Washes are for the gums and the mucous membrane

of the mouth. Washes are intended to be used as remedial agents and germ destroyers. A very useful wash is composed of:

Hydronaphthol or beta naphthol		℥i
Menthol		gr. ijss
Oil wintergreen Oil cinnamon or cassia	aa	Min. v
Glycerin Alcohol	aa	℥iij
Distilled water		℥x

M. Sig. Use as a mouth wash, full strength.

Mouth washes are like the hairs of your head—numberless—but as they are used they do not accomplish very much. In order to be effective the mouth must be scrubbed first, and then rinsed with cool water, and the wash is then introduced in a small quantity, ½ teaspoonful; the gums are rescrubbed for from one to two minutes, and the effect of the wash left to be diluted with the saliva. Even with this care the organisms are not all destroyed as a rule.

The Finsen Ray.—Any treatise on the gums would be incomplete if it did not consider the possibility of the use of the Finsen ray for the arrest of pus production. I have for a few months been using this ray in a limited number of cases, and it appears to me that we will have less use for drugs in the so-called pyorrhea after a year or two than we now have. There are still some difficulties to be overcome in the general use of the Finsen system in its application to the gums, but they are not insurmountable. The bactericidal effect of the ultra-violet ray is produced in something like four to five seconds in a field, with full exposure, by a Bang lamp, while the arc-light exposure requires about five minutes to destroy a culture of the staphylococcus pyogenes aureus. A slight erythema lasting for some days may always be expected in the use of the ultra-violet—the invisible ray. If this is brought in contact with the hair follicle the hair will drop out and the nails may become brittle. In the treatment of the gums these accidents are not likely to occur. Very shortly there will be on the market a sufficiently simple apparatus for gum treatment, which will make it possible for any one to use the ultra-violet or invisible ray even in the treatment of other affections of the gums.

From many years of observation of the gums I am convinced that the instruction given by the dentist to the patient is not sufficiently clear or impressive to do the greatest good, therefore I appeal to you to give a demonstration every time you find any discharge from between the gum and the tooth to make it an object lesson. Cases of this kind may improve with drugs alone—but a certain amount of delicate and exact surgery is requisite to effect a cure, which will not be permanent unless great care is exercised continuously by the patient.—*Items.*

IMPORTANCE OF THE MESIO-DISTAL RELATION OF THE TWO ARCHES DURING CHILDHOOD. By Dr. S. M. Weeks, Philadelphia. Read before the Academy of Stomatology, Philadelphia, March, 1903. I wish to invite your attention for a few minutes this evening to a phase in the care of children's teeth which it seems to me has been neglected. We hear a great deal about the proper care of the mouths of children for the preservation of their teeth, and, when decayed, about the best methods of replacing lost structure, etc. All of this we know to be of fundamental importance, but there are other conditions equally vital.

It is to the matter of irregularities and the mesio-distal relation of the two arches that I refer. I believe the early recognition of certain abnormal tendencies in the eruption of the teeth to be of such importance that its neglect makes us responsible for a long line of subsequent difficulties. On the other hand, a right understanding of the conditions present and those sure to follow enables us by small effort to correct these errors of development, which if allowed to continue would cause us much trouble and our patients much inconvenience.

In using the term children in this paper I wish to explain that I mean those in that period of life from the time the first permanent molars are erupted until the time when all of the teeth except the third molars are in place; in other words, that period when, if asked to give advice about an irregularity, it has been customary to say, "Oh, better leave it until all of the teeth are in place." The bugbear of procrastination has attached itself to us so long that I want to emphasize my belief that this is an error for which without injustice we could be strongly censured.

There is no doubt that in many cases from the age of six to four-

teen we find certain irregularities beginning to be manifest concerning which it is hard to decide as to the best course to pursue. Many are cases where very little effort on our part would have set these irregularities right at this age, but, as with many which I have seen, when fully developed and fixed, two years was considered a short time in which to correct.

The time at my disposal is so out of proportion to the number of phases which should be considered that I shall hurriedly pass many, taking up more in particular one phase, the effects of which seem to be so pernicious and far-reaching as to brook no delay in receiving attention. This phase is evidenced by the loss of the proper relation between the superior and inferior arches. For a starting-point we must assume some condition which will indicate the normal relation. From the fact that the first molars are the first teeth of the permanent set to erupt, I believe we can do no better than to depend on them as a basis from which to start. If these are normal then the two arches may be said to be correctly related to each other mesio-distally.

There are several ways in which variations from the normal may be manifested, only two of which will concern us in this paper. One is where the mesio-buccal cusps of the upper first molar occlude mesially to the mesio-buccal groove of the lower first molar. The other is just the reverse. I believe only in hereditary cases is this condition noted before the eruption of the first molars; after that time it may develop at almost any stage up to the time of the fully erupted denture, and in a few cases not even excepting the third molars.

There are several groups of conditions to which we may look for causes of this abnormal relation. The first we might call a local group, because it is in conditions existing in the arrangement of the teeth themselves that we find the cause. These are many and I can take time to enumerate only a few: Loss of a deciduous tooth, thus allowing teeth to move forward or backward, as the case may be. Loss of space in the arch through decay on the approximal surfaces. Both of these conditions make it possible for the first permanent molars to take a position anterior to that which nature intended. Too long retention of a temporary tooth, thus deflecting the permanent tooth which is to follow. Too early eruption of some of the permanent teeth. A supernumerary tooth in

the arch, enlarging it beyond the normal. Loss of a permanent tooth, etc. In fact, any obstruction which fails to allow the lower jaw to be occluded with the upper in its normal position.

In another group of cases we may find our cause arising from conditions outside the dental apparatus. This would be so in cases of mouth-breathing, persistent habits of thumb-sucking, lip-biting, etc.; also in some cases I believe it to be possible for the third molar erupting under certain conditions to be a cause.

In many of these cases we must look also for some change in the temporo-maxillary articulation. Were it not for some abnormality in this articulation we would not find these classes of malocclusion having such a marked effect on the physiognomy. Again, when we find under favorable conditions that we can in a few weeks effect a change of several millimeters in the relation between the superior and inferior arches, we feel that this must have been by means of a change in the articulation rather than in the alveolus. There are several reasons why this phase should receive attention at the first indication of a developing abnormality.

It is in these cases that the facility of mastication is most interfered with. It is not so very rarely that we find cases where the lower jaw is drawn forward to such an extent that, in conjunction with a contracted upper arch, we find very few, often no more than four, teeth in occlusion.

Next are those many cases of altered appearance for which this condition is responsible. I believe we have small conception of the number of faces which are given an appearance of weakness because the mandible has been allowed to drop back to a point distal to the normal. On the other hand, the reverse condition, while it offers no suggestion of weakness of character, brings us no less number of facial deformities.

In closing I wish to say just a few words relative to the correction of such cases. Of course it would be much easier to pay attention to the early conditions, thus preventing the occurrence of any irregularity; hence if a tooth is lost that space occupied by it should be retained. If space has been lost by caries on the approximal surfaces it should be regained and retained by the use of gutta-percha or some other proper method. Naturally, whatever be the cause it should be removed. Of course there are many cases that we do not see in time to treat in this early stage. While it is essential that

all cases of irregularities should be treated as soon as brought to our notice, it is doubly true of those where the normal mesio-distal relation of the two arches is being lost. It is then that the loss of facial harmony is being effected, and we have another factor entering, which in importance is perhaps second to none.

In cases of this type it has sometimes seemed easy to extract teeth and correct a prognathism, but this procedure does nothing towards correcting abnormalities in the facial lines. I believe that there are but a *very* few of these where extracting should be countenanced. The teeth should be placed in their proper alignment and the arches restored to their normal occlusion, thereby bringing the facial lines into harmony.—*International.*

ERRORS OF REFRACTION A POSSIBLE SOURCE OF DENTAL NEURALGIA. By J. R. Clayton, D.D.S., Shelbyville, Ind. About fourteen years since there fell into the practice of the writer a lady thirty-two years of age, rather robust of build and well nourished. She had lost all the lower molars on the left side without the least sign of decay or any other visible cause. The first time that she presented she was suffering from pain of the same character in the second bicuspid, and fully expected the loss of that tooth, as she had been informed by my predecessor that she was the victim of an incurable disease and must eventually lose all her teeth, to be replaced with artificial ones, and the sooner that they were all pulled out the better. By exclusion the only thing that could be got at was pulp-stone. The tooth was drilled into to a sufficient depth, a little arsenic put in, and the pulp destroyed without pain. Opening the pulp-canal, not the least sign of pulp-stones could be found, and all that could be done was to fill the canal and cavity. The tooth was saved, the patient pleased, and the dentist humiliated.

In about six months the patient came again with the same sort of trouble in the first bicuspid. The tooth was as perfect as a tooth could be. In the course of the examination, which was mere floundering around in the dark, the fact that disorders of the teeth frequently produced pain in the eyes by reflex action came to mind, and thinking that it is a "poor mule that cannot kick both ways," the patient was asked if the eyes had ever been examined to ascertain if there was any error of refraction. "Nothing the matter with my eyes," was the reply. After a good deal of sparring, in which she

sought to show me that, being a dentist, I had no business to be bothering myself about the eyes, she was told that nothing further could be done until such an examination was had, and she agreed to go to an oculist on the following day. To her astonishment and, it must be confessed, to the gratification of the poor dentist, her eyes were found to be astigmatic in a high degree, of different degree in each eye and of different axis. These errors were corrected, and for the next four years in which she was under observation there was no recurrence of the trouble.

Four years ago the writer had a light paralytic stroke of sufficient force to put the left hand to some extent out of action. Inasmuch as he had not been able to lay up more than his share of the "filthy lucre" that we all abuse when it is in the hands of the other fellow, but try so hard to get into our own, when it changes color, he had to look for some other port to anchor in when the stormy days of old age came upon him. Having given some time to the study of the laws of optics in younger days, the idea dawned upon him that a little special study might enable him to make some use of that knowledge. The effort was made to acquire sufficient knowledge and skill to diagnose and measure the degree of errors of refraction and to fit glasses for their proper correction. His time is now divided between operative dentistry and optical work.

Two years since a medical friend referred a patient to him to see what in the world was the matter with the teeth. She was suffering from general nervous exhaustion that would not respond to any treatment, and, like a good many physicians, he was disposed to charge the whole business to the teeth, because he could not find anything else that could be the cause. After going over the teeth and finding nothing that could produce such derangement, attention was given to the eyes. Placing the lady before the ophthalmometer, the eyes were at once seen to be astigmatic. She was referred back to her physician with the recommendation that glasses be fitted to the eyes to correct the error, with the expectation that much of the trouble would abate. I have been informed that much has been done, but because of other disturbances peculiar to her sex a full recovery has not yet been attained.

When we call to mind the fact that an error of refraction will cause pain in the eye, headache, congestion of the conjunctiva, an expression of the eye as if the patient had been crying, aching in the

top of the head, in the medulla, sickness of the stomach, and in extreme cases a condition that may be mistaken for epilepsy (a case with which the writer is familiar and which was cured by the use of the proper correction), does it take much of a stretch of the imagination to include some of the ailments of the teeth that give the patient so much suffering and cause the honest dentist so much perplexity and humiliation? The writer is well aware that "one robin does not make a spring, nor do two swallows make a summer," but one straw may show which way the wind is blowing as well as a handful. From his limited experience as above related the writer is convinced that many of the cases that so perplex us are due to an error of refraction, and would recommend that such cases be given the benefit of an optical examination.—*Brief.*

JACKET CROWNS. By Dr. A. C. McAlpin, Warren, Pa. Read before the Lake Erie Dental Society, May, 1903. The application of the jacket crown is indicated in those cases where the tooth is beyond successful structural restoration by filling, to peg teeth and to teeth that are slightly out of correct position, and in these cases where the retention of the life of the teeth is desirable. It is contended that a more intimate knowledge of and practice with this crown will induce many who now with the utmost impunity destroy tooth-life, to take the little extra pains necessary to produce the permanent artistic jacket, and at the same time conserve the normal life energy which is better, no matter what specious arguments are made to the contrary. The jacket crown is simple in its construction and yet is susceptible of the greatest skill in its application. Briefly stated, the crown consists of a platinum shell fitted over a stub of tooth, and upon which is fused porcelain body with a veneer facing.

As these crowns are used mostly on the anterior teeth I will describe a case as applied to an incisor. The tooth is dressed down to a wedge-shaped stub with lingual ground sufficiently to accommodate a 28-gauge plate and a labial space of at least 16-gauge. The cervical ridge is obliterated. A cylindrical platinum band lap joint 30-gauge as long as the original crown is fitted at the cervix. This is then held in position, while on the lingual portion a line is scratched along the cervical margin and at the linguo-distal and mesial angles. The space within these lines is then ground with a

coarse dry stone until very thin, and the metal is burnished down until the lingual aspect is shaped as the surface on the finished crown should appear. This surface is then reinforced by another platinum plate, 30-gauge, which is burnished and shaped to it and soldered with pure gold. The labial portion of the cylinder is then ground in the same way and the metal adapted to the stub by rough-end instruments to prevent burnishing, as the fresh-ground surface affords strong adhesion to the porcelain body. High-heat porcelain body is then fused to the ground labial surface, bringing the body to a good flux only. Then a suitable veneer facing ground thin is attached with added body by the second baking. The metal back is finished as metal crowns usually are and the jacket is adjusted as is the ordinary shell crown.

In this era of porcelain dental work the jacket fills a position which is unassailable by any other form of crown. Attempts are made to attach ordinary facings to gold shells, but these must necessarily be bulky and bungling when compared to the true jacket crown. Once one familiarizes himself with the possibilities in the application of the jacket crown he opens the way to far more satisfactory work than was possible before.

It is worth one's while to begin porcelain work as early as possible, for its varied uses tend to bring out the operator's talent, manipulative and artistic ideas more than any other phase of dental labor.—*Summary.*

Repairing of Chipped Inlays.—Chipping may occur on the grinding surface of a molar or bicuspid. Even from a good joint the cement will sometimes slightly wash, when the crushing strain from the opposite tooth may readily chip the unsupported porcelain; this gives renewed opportunity for the washing out of the cement and for further chipping. Chipped margins in molars or bicuspids where a slight line of metal will not be objectionable can be easily mended in the following manner: The edge should be cut out with a fine fissure bur and filled with gold or amalgam. The method of filling is as follows: Wash out the fissure with alcohol and dry. Place in the fissure a small quantity of thin oxyphosphate of zinc and squeeze it out with pieces of sponge gold, being careful not to make lateral pressure on the filling in a way to dislodge it. Let the cement harden, then cleanse the margins, condense the sponge gold, and finish the filling in the usual way. Where amalgam is used the cement should be squeezed out by soft amalgam in the same way, the margins then cleansed, and amalgam dried of its excess mercury added until the filling is of the proper consistence to set well.—Joseph Head, *Summary.*

The Dental Digest.

PUBLISHED THE FIFTEENTH DAY OF EVERY MONTH
At 2231 Prairie Avenue, Chicago,
Where All Communications Should be Addressed.

Editorial.

CARMICHAEL AND DUNN PATENTS.

Our readers are probably aware that Dr. J. P. Carmichael of Milwaukee and Dr. J. E. Dunn of Chicago have for some time been selling office rights to manufacture and use certain appliances for use in the mouth on which these gentlemen hold patents. Dr. Carmichael brought suit a few days ago against some members of the Protective Association in Milwaukee for infringing his patent, and the Association has undertaken the defense in these cases. The profession will be informed through these columns of the outcome of the suits. In response to numerous requests for information, the Association's attorneys are looking up Dr. Dunn's patent, and so soon as they submit their opinion we will publish same. Meanwhile we would urge all members of the Protective Association and the profession generally not to pay one cent for office rights to any individual without first consulting with the chairman of the Protective Association.

ADVERTISING VERSUS PROFESSIONAL CLINICS.

In our August, 1903, issue, in discussing the meeting of the National Dental Association at Asheville, we criticised the advertising clinic. Every dental society, large or small, should make a sharp distinction between the professional and the advertising clinic. No matter whether the clinician is a dentist or not, if he is demonstrating an article or material which he manufactures or sells, or in which he has any pecuniary interest, he should buy exhibit space just as the other dealers do and show his wares in the proper place. It might be reasonably expected that professional men would have better taste than to sail under false colors and pretend to give a professional and disinterested clinic when in reality they are simply advertising their wares, but if certain individuals have no sense of

propriety or of the eternal fitness of things the society should show them their place and make them keep it.

The same principle holds good as regards papers. Dentists do not attend society meetings to hear some manufacturer or his agent describe from the platform the merits of his products, and to allow this to be done is not only an imposition on those in attendance but cannot help weakening the influence of the society and lowering its ideals. At a meeting recently held in the east a dentist from the west, whose papers are noted for length, verbosity and for having no reference to dentistry, bored the audience for several hours with an essay which related to dentistry only in the fact that a portion of it was devoted to the description of an aid to dental practice manufactured by the speaker. This is an extreme case, but almost every society is imposed upon in this regard to a greater or less extent. Dental organizations should be careful whom they entertain. A society in the far west recently "entertained as its guest" a dentist who left in disgrace the city in which he had been practicing. Men who are discredited in their own community are frequently made much of by societies in other localities. All of which tends to lessen the influence of dental societies upon the profession at large.

We refer to the matter at this time because the season for state meetings is at hand. Primarily the program, exhibit, or executive committees, one or all, are to blame for these glaring faults, but secondarily the society must shoulder the responsibility, for if the members did not silently endure the imposition year after year it would soon be stopped. If dental societies cannot hold successful and profitable meetings with only professional and scientific papers and clinics, and without the aid of the "genteel" advertiser, they would better disband.

WHY SOCIETY MEETINGS ARE NOT ATTENDED.

We have frequently discussed in the past the question of why society meetings are not better attended, and we have offered some reasons for the condition of affairs. At present ten per cent or less of the men in a state are members of the state society, and about half of the membership attends the meeting. It is true that dentistry is narrowing, and that the average practitioner is apathetic and takes little interest in the work of his profession, but the dental organizations themselves are to blame for the most part. In the first

place, the meetings are not well advertised. In most instances the secretary sends a three or four line notice to a few of the journals a short time before the meeting. A vigorous advertising campaign should be started at least six months before the day of convention, and notices of various kinds, including the program, should be sent each month to every dental journal, and a notice and a program should be mailed to every dentist in the state at least one month before the society meets. To do this it would be necessary for the program to be made up at least six weeks in advance of the meeting, which would be a very good thing. Usually the program is not completed until a few days before the society meets. Issuing the program early would force the essayists to write their papers before they come to the meeting, and then copies could be sent a few days in advance to those who are to discuss the papers, which would insure better papers, shorter and more relevant discussions, and more interesting meetings. The time before some of the meetings is now short, but the officers have several weeks in which to arouse the interest not only of the present membership but of the men throughout the state, and we would urge them to dig this work out of the rut in which it has buried itself and make the meetings of 1904 the best in the history of the societies.

Notices.

TEXAS STATE DENTAL ASSOCIATION.

The Texas State Dental Association will hold its twenty-fourth annual meeting at Corsicana, May 5-7, 1904. All ethical members of the profession are invited to meet with us. BUSH JONES, Secy., Dallas.

ANDERSON (IND.) DENTAL ASSOCIATION.

The Anderson (Ind.) Dental Association was organized January 25, 1904, and the following officers were elected: President, C. W. Orland; Vice-president, H. E. Schellenger; Secretary and Treasurer, R. T. Brookins.

LOWELL (MASS.) DENTAL ASSOCIATION.

The annual meeting of the Lowell Dental Association was held Jan. 27, 1904, and the following officers were elected: President, W. H. Downs; Vice-presidents, J. V. Pepin and Edwin Farrington; Secretary, E. E. Kinney; Treasurer, V. E. Darling; Executive Committee, C. E. Snyder, F. G. Guilliland, W. H. Pepin, W. E. Knapp, B. F. Heald.

SEDALIA (MO.) DENTAL SOCIETY.

The Sedalia (Mo.) Dental Society held its semi-annual election of officers January 26, 1904, with the following results: President, C. E. Fletcher; vice-president, C. C. Clark; secretary and treasurer, M. L. Myers.

INDIANA STATE DENTAL ASSOCIATION.

The Indiana State Dental Association will hold its annual meeting at Indianapolis, June 14-16, 1904. Prospects are bright for a big meeting.

A. T. WHITE, Secy., Newcastle.

UTAH STATE DENTAL ASSOCIATION.

The Utah State Dental Association will hold its eleventh annual meeting and clinic in Salt Lake City, April 8-9, 1904. A cordial invitation is extended to all ethical members of the profession to attend.

S. W. WHERRY, Secy., Ogden.

FOND DU LAC (WIS.) DENTAL SOCIETY.

The annual meeting of the Fond du Lac Dental Society was held January 26, 1904, and the following officers were elected: President, J. L. Blish; vice-president, C. A. Cheney; secretary and treasurer, W. E. Tennant; member board of censors for three years, T. A. Hardgrove.

JO DAVIESS COUNTY (ILL.) DENTAL ASSOCIATION.

The Jo Daviess County Dental Association held its annual meeting at Stockton January 26, 1904, and elected the following officers: President, F. Stryker, Galena; vice-president, W. R. Russell, Stockton; secretary and treasurer, A. R. Speer, Hanover.

W. R. RUSSELL, Vice-Pres., Stockton.

UNIVERSITY OF IOWA DENTAL DEPARTMENT ALUMNI ASSOCIATION.

The Alumni Association of the University of Iowa Dental Department was organized Feb. 2, 1904, and the following officers were elected: President, K. M. Fullerton, Cedar Falls; Vice-president, J. B. Pherrin, Central City; Secretary, E. A. Rogers, Iowa City; Treasurer, C. M. Work, Ottumwa.

LEHIGH VALLEY DENTAL SOCIETY.

The Lehigh Valley Dental Society held its annual meeting at Allentown, Pa., January 18, 1904, and elected the following officers: President, H. S. Seip, Allentown; vice-president, O. H. Uhler, Allentown; recording secretary, H. W. Wiltberger, Allentown; corresponding secretary, H. W. Solt, Bethlehem; financial secretary, H. A. Jelly, Allentown; treasurer, J. C. Hertz, Easton; executive committee, W. A. Crane, Phillipsburg; W. M. Skinner, Philadelphia; G. J. DeLong, Allentown.

HONOLULU DENTAL SOCIETY.

The annual meeting of the Honolulu (Hawaii) Dental Society was held Jan. 19, 1904, and the following officers were elected: President, M. E. Grossman; Vice-president, A. B. Clark; Secretary, C. B. High; Treasurer, O. E. Wall.

SOUTHEASTERN IOWA DENTAL ASSOCIATION.

The Southeastern Iowa Dental Association was permanently organized at Ottumwa, Feb. 18, 1904, and the following officers were elected: President, C. M. Work, Ottumwa; Vice-president, A. W. Dana, Burlington; Secretary, W. M. Terry, Washington; Treasurer, E. C. Bock, Fairfield. The first annual meeting will be held at Burlington.

MINNESOTA STATE BOARD OF DENTAL EXAMINERS.

The Minnesota State Board of Dental Examiners will meet at the Dental Department of the State University at Minneapolis, April 5-7, 1904, for the purpose of examining applicants for license. No application will be received after 12 m., April 5. C. H. ROBINSON, Secy., Wabasha.

TEXAS STATE BOARD OF DENTAL EXAMINERS.

The Texas State Board of Dental Examiners will hold its next examination in Corsicana, beginning May 9, 1904, at 10 a. m. Applicants will be examined practically and theoretically, and must come prepared to do operative work, furnishing their own materials, instruments and patients. For further information address

C. C. WEAVER, Secy., Hillsboro.

CHESTER AND DELAWARE COUNTY DENTAL ASSOCIATION.

The annual meeting of the Chester and Delaware County Dental Association was held January 27, 1904, at Media, Pa., and the following officers were elected: President, F. M. Smith, Chester; vice-president, H. I. Haines, Coatesville; secretary, J. H. Campbell, Media; treasurer, H. L. Smedley, Media; executive committee, S. B. Luckie, Chester; D. M. Cox, Chester; H. C. McCowan, West Chester.

NEW YORK COLLEGE OF DENTISTRY ALUMNI ASSOCIATION.

The annual meeting of the Alumni Association of the New York College of Dentistry was held Jan. 20, 1904, in New York, and the following officers were elected: President, H. R. Armstrong; 1st Vice-president, J. Refsum; 2d Vice-president, A. Wagner; Secretary, G. C. Rathfelder; Treasurer, F. A. Chicherio; Curator, Frank J. McLaren; Executive Committee, C. F. Rabell, Chairman; J. M. Sinshimer, A. M. Birkhahn. A paper was read by Dr. C. B. Isaacson and generally discussed, and at the close of the meeting a collation was served.

G. C. RATHFELDER, Secy.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

It will be necessary for those members of state boards who desire copies of the proceedings of the meeting held at Asheville, 1903, to have their secretaries send their names and addresses to the undersigned. The secretary of the Association does not possess occult powers, and only nineteen states have responded as the result of two notices published in the journals during the year.

CHAS. A. MEEKER,
Secy., 29 Fulton St., Newark, N. J.

LOS ANGELES ASSOCIATION OF DENTAL ALUMNI.

At the annual meeting of the Los Angeles Association of Dental Alumni, December 1, 1903, the following officers were elected: President, J. F. Cook; vice-president, J. W. Gray; secretary and treasurer, G. M. Crow; corresponding secretary, J. F. Curran; member board of directors, O. P. Roller. The present membership of the association is sixty. The meetings are held the first Tuesday of each month at the offices of the different members, with an occasional banquet interspersed to foster the social spirit.

J. F. CURRAN, Cor. Secy., Los Angeles.

CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

At the annual meeting of the Central Dental Association of Northern New Jersey, held at Newark, February 15, 1904, the following officers were elected: President, C. S. Stockton, Newark; Vice-president, F. S. Dunning, Paterson; Secretary, H. P. Marshall, Newark; Treasurer, C. A. Meeker, Newark; Executive Committee, R. M. Sanger, Chairman, East Orange; W. M. Gould, Secretary, Newark; N. M. Chitterling, Bloomfield; F. L. Manning, Redbank; Frederick W. Stevens, Newark.

FREDERICK W. STEVENS, Ex-Secy.

FOURTH INTERNATIONAL DENTAL CONGRESS—COMMITTEE ON STATE AND LOCAL ORGANIZATION.

In the November issue of the DIGEST, page 1419, we published a notice concerning this committee and gave a list of the state chairmen. The following changes and additions have been made since that date:

Illinois.—J. E. Hinkins, 131 E. 53d St., Chicago, to succeed F. H. Zinn.
Maine.—H. A. Kelley, 609 Congress street, Portland.
Mississippi.—W. R. Wright, Jackson.
New Hampshire.—E. C. Blaisdell, Portsmouth.
Oregon.—S. J. Barber, Macleay building, Portland.
South Dakota.—E. S. O'Neil, Canton.
Vermont.—S. D. Hodge, Burlington.
Washington.—G. W. Stryker, Everett.

ONTARIO DENTAL SOCIETY.

At the annual meeting of the Ontario, Canada, Dental Society, held in Toronto, Feb. 9-11, 1904, the following officers were elected: Hon. President, R. E. Sparks, Kingston; President, A. W. Thornton, Chatham; Vice-President, J. R. Mitchell, Perth; Secretary, Guy G. Hume, Toronto; Treasurer, R. G. McLean, Toronto; Archivist, W. H. Willmott, Toronto; Program Committee, W. C. Trotter, R. G. McLaughlin, A. E. Webster, G. Martin, W. Sercomb, all of Toronto. District Representatives, No. 1, A. A. Smith, Cornwall; No. 2, W. Adams, Whitby; No. 3, A. W. Spalding, Toronto; No. 4, F. Hansel, Hamilton; No. 5, P. P. Ballachey, Brantford; No. 6, W. A. Brownlee, Mount Forest; No. 7, A. E. Santo, London.

GUY G. HUME, Secy., Toronto.

FOURTH INTERNATIONAL DENTAL CONGRESS—DEPARTMENT A, SECTION 1, ANATOMY, PHYSIOLOGY, HISTOLOGY AND MICROSCOPY.

The membership of this section is as follows: M. H. Cryer, M. D., D. D. S., 1420 Chestnut St., Philadelphia, Chairman; Thomas C. Stellwagen, M. D., D. D. S., Philadelphia; A. P. Brubaker, M. D., D. D. S., Philadelphia; Thomas Fillebrown, M. D., D. D. S., Boston; A. H. Thompson, D. D. S., Topeka, Kan.; Walter Harrison, D. M. D., Harv., L. D. S., England; J. F. Colyer, L. R. C. P., M. R. C. S., L. D. S., England; A. Hopewell-Smith, L. R. C. P., M. R. C. S., L. D. S., England; D. E. Caush, L. D. S., England; G. C. Campion, L. D. S., England; J. T. Turner, L. D. S., England; Thomas E. Constant, L. R. C. P., M. R. C. S., L. D. S., England; Joseph A. Wood, L. D. S., England; Joseph Cockburn, L. D. S., Ireland; W. D. Miller, D. D. S., M. D., Ph. Sc. D., Germany; Prof. Dr. Walkhoff, Germany; Dr. Oskar Römer, Germany; Dr. Otto Zsigmondy, Austria; Dr. Rudolph Weiser, Austria; Dr. Rudolph Loos, Austria; Florestan Aguilar, D. D. S., Spain; Dr. John E. Grevers, Holland; Prof. J. Choquet, France; Prof. Alexis Julien, France; Dr. N. Etcheparaborda, Argentina, S. A.

NEW HAVEN DENTAL ASSOCIATION.

The annual convention of the New Haven Dental Association will be held March 15 and 16, 1904, at Harmonie Hall, New Haven, Conn. This promises to be the largest meeting ever held in the East, with a large number of clinics and one of the finest exhibits ever shown. Essays by the following members of the dental and medical profession are promised: Drs. R. Ottolengui, New York; Henry C. Bœnning, Philadelphia; G. Lenox Curtis, New York; Herbert L. Wheeler, New York; R. A. McDonnell and Wm. H. Metcalf, New Haven; J. Wesley Shaw, Springfield. Also a large clinic from residents of New York, New Jersey, Philadelphia, Massachusetts and Connecticut, and two surgical clinics provided suitable cases are presented. The business meeting will be dispensed with, thereby allowing ample time for the thorough discussion of all papers. It will

amply repay all to attend this convention, and enable those who have never had an opportunity to visit the Elm City, the privilege of the freedom of Yale University and the campus. The arrangement committee have been especially active, having arranged for a banquet on the evening of the first day, and in addition are arranging with the N. E. Passenger Association for a one and a third rate on the certificate plan, provided one hundred tickets are sold for seventy-five cents or over. (Secure certificate when purchasing ticket.) An invitation is extended to all ethical practitioners to join with us and take an active part in our meeting.

FREDERICK W. BROWN, Prest.
E. FRANK CORY, Secy.

IN MEMORIAM—DR. A. J. OAKEY.

Through the will of an All-wise Providence we are called upon to mourn the loss of one of our most beloved members, who, with his two daughters, met death at the Iroquois Theater fire, Dec. 30, 1903.

Dr. A. J. Oakey began the practice of dentistry in 1889, having graduated that spring from the Chicago College of Dental Surgery. He served his patients faithfully and well. He made himself honored and respected by the dental profession, was active in society work, having helped to organize the Englewood Dental Society, and was one of its early presidents. He later served as secretary for the same society a term of two years, and since that time has been active and zealous in promoting its interests and elevating the standard of his profession.

Resolved, That in the death of Dr. Oakey the members of The Englewood Dental Society have suffered an irreparable loss. Through association with him in the past they had learned to love him as a friend, respect him for his high sense of honor, and to look upon him as a consistent Christian man.

Resolved, That an expression of our sympathy and condolence be extended to his bereaved family, especially to his wife, who is so bravely and beautifully facing the inevitable.

Resolved, That a copy of these resolutions be placed upon our records and that copies be sent to the leading dental journals for publication, and to the family.

T. ELHANAN POWELL,
W. B. WINGET,
H. O. BROWNING,
} Committee.

IN MEMORIAM—DR. M. B. RIMES.

Through the Providence of God, whose law controls the destiny of man, the career of Dr. M. B. Rimes, an active member of this society, has been brought to a sudden close. He, with his wife and three children, met death at the calamitous Iroquois Theater fire, Dec. 30, 1903.

Dr. Rimes began the practice of his profession in Englewood in March, 1891, after finishing his course in the Chicago College of Dental Surgery. He

had a large clientele, whose confidence in his ability was amply justified by the results of his efforts. He was jealous of the honor of his profession and was active in promoting its interests. He efficiently served consecutively as secretary and president of this Society, and was active in recruiting its membership among the younger men who came to our locality. His life was consistent with his principles and ideals, and he was respected and loved by his associates.

Resolved, That we give to the remaining members of his family an expression of our sympathy in their great bereavement.

Resolved, That a copy of these resolutions be made a part of the records of the Society, and that copies be mailed to the leading dental journals for publication, and to his family.

T. ELHANAN POWELL,
W. B. WINGET,
H. O. BROWNING,
} Committee.

News Summary.

L. D. FROST, 70 years old, a dentist of Harlan, Ia., died Feb. 16, 1904.

I. S. SCHOENBROD, a dentist of Chicago, committed suicide Feb. 21, 1904.

JOHN WAGNER, a dentist at Cleveland, committed suicide Feb. 6, 1904.

EDWIN BECK, a dentist at Chalfont, Pa., died Feb. 2, 1904, of apoplexy.

GEORGE P. HOLMES, 72 years old, a dentist of St. Louis, died Jan. 29, 1904.

L. S. JONES, 49 years old, a dentist at Harrisburg, Pa., died Feb. 13, 1904.

C. F. E. BLOOD, 78 years old, a dentist at New London, Conn., died Feb. 12, 1904.

O. H. BRIGHTWELL, 63 years old, a dentist of Washington, D. C., died Jan. 28, 1904.

L. R. ESAU, 44 years old, a dentist in Milwaukee, died Feb. 5, 1904, from apoplexy.

K. F. ELLER, 55 years old, a dentist of Louisville, died Feb. 5, 1904, of apoplexy.

J. H. WHITFIELD, 25 years old, a dentist of St. Louis, committed suicide Feb. 11, 1904.

A. E. THAYER, 27 years old, a dentist of Philadelphia, died Feb. 15, 1904, of pneumonia.

CHAS. CAMPBELL, 36 years old, a dentist at Bidwell, O., died Jan. 24, 1904, from consumption.

O. L. GORDON, 60 years old, a dentist at Santa Cruz, Cal., died Jan. 24, 1904, after a long illness.

S. J. JOHNSON, 35 years old, a dentist at Welch, W. Va., died Jan. 20, 1904, after a brief illness.

J. E. SMITH, a dentist of New York, has been missing from his home for the past five weeks.

J. R. STEWART, 31 years old, a dentist of Coldwater, Mich., died Jan. 31, 1904, of pneumonia.

JOHN C. JONES, JR., a dentist at Millville, N. J., dropped dead Feb. 3, 1904, while working at his chair.

BYRON GORDON, 63 years old, a dentist at Moline, Ill., died suddenly Feb. 17, 1904, from acute quinsy.

W. D. SAUNDERS, 35 years old, a dentist of Grand Rapids, Mich., committed suicide Jan. 27, 1904.

LEONARD EDE, a young dentist of Reno, Nev., disappeared three weeks ago and has not been heard from since.

PROFESSIONAL WISDOM depends on knowing how to do the right thing at the right time and how to do it well.—*Alk. Clinic.*

AUGUST HARTGROVE, formerly in the practice of dentistry at Harper's Ferry, W. Va., died Jan. 22, 1904, from softening of the brain.

W. W. MITCHELL, a dentist at Anderson, Ind., disappeared from his home about one month ago and has not been heard from since.

IMPRESSION TAKING.—In proportion as it would be difficult to remove an impression, plaster of Paris becomes needful.—R. OTTOLENGUI, *Cosmos.*

DENTAL SCHOOL MERGER DECLARED OFF.—The University of Illinois Dental Department and the Chicago College of Dental Surgery have severed connection.

PROTECT THE EYES.—Colored glasses should always be worn when doing bright and glaring work with the blowpipe or porcelain furnace.—S. E. KISER, *Bur.*

TEETH OF SCHOOL CHILDREN.—A dentist of Germany states that out of 5,300 school children examined only 4.37 per cent had sound teeth.—*Cana. Jour. of Med. and Surg.*

SENSITIVITY OF THE TONGUE.—The most sensitive part of the human body is the tip of the tongue. Next come the lips and then the tips of the fingers.—*N. Y. Med. Times.*

SUCCESS.—Good work first; good fee second; good collections last, but not least. It takes a good one to combine the three; if you can do it success is yours.—T. P. WILLIAMS, *Tex. Dent. Jour.*

INSERTING GUTTA-PERCHA OR CEMENT.—To keep gutta-percha or cement from adhering to the instrument while inserting in a cavity, dip the instrument into talcum powder or powdered soapstone.—*Review.*

PORCELAIN INLAY NON-STAINABLE.—Tobacco will not stain a porcelain inlay as it will the tooth in which the inlay is inserted—so say tobacco chewers.—*Hints.* If this is true, porcelain inlays are contraindicated.—ED.

REMOVAL OF GOLD MATRIX FROM INLAY.—The gold matrix may be easily and thoroughly removed from the inlay by immersing in aqua regia (nitro-hydrochloric acid) for twenty or thirty minutes.—D. W. BARKER, *Summary.*

SALT SHAKER CONVENIENT IN LABORATORY.—A small salt shaker is a convenient and clean holder in which to keep salt or potassium sulphate, used to hasten the setting of plaster.—A. W. THORNTON, Chatham, Ont., *Review.*

CAVITY VARNISH.—Dissolve copal in equal parts of alcohol and chloroform; add equal volumes of hydronaphthol. The product will be a very adhesive and strongly antiseptic varnish, free from all caustic properties.—*Stomatologist.*

ENLARGED TONSILS.—It is well to bear in mind the fact that enlarged tonsils lessen the capacity for proper breathing, and that once they are inflamed they serve as a possible point of entry for all manner of infections.—*Intern. Jour. of Surg.*

PREMIUMS HIGH.—Don't adopt one or two year policies, such as misleading advertisements or "slashing prices," for gaining business. The premium on such is high. It is the premium of change.—H. DARLING, Sault Ste. Marie, Mich., *Review.*

GAS MAKES PATIENT PUGILISTIC.—It is reported from Liverpool that a dentist administered gas to a brawny laborer and extracted four teeth. Before fully recovering consciousness the man violently attacked the dentist. We have previously recorded similar cases.

NORMAL SALT SOLUTION.—By normal salt solution is meant a solution of six parts of sodium chlorid in one thousand of water. It is most readily prepared by dissolving one compressed tablet, No. 365 (Parke, Davis & Co.), in four fluidounces water.—*Dent. Off. and Lab.*

HYDROGEN DIOXID, in the form of a thirty per cent solution, has been used with complete success as a styptic in hemorrhage due to polyps of gums and pulp-extirpation. A piece of surgical sponge is saturated with hydrogen dioxid and inserted in the pulp-chamber.—*Summary.*

BANKRUPT.—Samuel Merrill, a dentist at Gloversville, N. Y., filed a petition in bankruptcy Jan. 27, 1904, scheduling his debts at $1,336, no assets.—A. J. Richter, a dentist of Milwaukee, filed a petition in bankruptcy Jan. 19, 1904, listing his liabilities at $1,453, and his assets at $802.

USE RUBBER DAM WHEN INSERTING AMALGAM FILLINGS.—Don't neglect the use of rubber dam in amalgam filling. There are few fillings that would not receive better manipulation with the dam rather than with the hurry of napkins and cotton rolls.—HAROLD CLARK, *Dominion.*

AMBIGUOUS.—Our English cousins use "left off" for our "cast off" as applied to second-hand garments. The following ad recently appeared in a London paper: "Mr. and Mrs. Hardy have left off clothing of all kinds. They can be seen any day from 3 to 6 p. m."—*Lippincott's.*

DENTIST BLAMED FOR BRUISES.—Last month a man in East Hampton, Mass., was arrested for wife-beating. When his wife appeared in court her face was badly cut up, but she insisted that her injuries were in no way due to domestic trouble, but had been inflicted by a dentist who removed three teeth. The court, however, fined the husband.

GERMANY RULES AGAINST AMERICAN DENTISTS.—Feb. 27 the highest court of appeal in the German empire decided that American dentists were not entitled to the use of the title "Doctor," and that if they used it on their door plates, letterheads or in any other way they would be punished.

WELCOME VISITOR.—The DIGEST is certainly a welcome visitor. Please continue to send it so long as you are connected with it.—R. A. Adams, Clinton, Ind.—The DIGEST is a mighty fine journal and has paid me many times the little dollar it takes to get it for a year.—R. B. Colvin, Berlin, Pa.

POISONING FROM THE EXTERNAL USE OF CHROMIC ACID.—Several cases of profound toxic symptoms (going on to death, it is believed by some) have resulted from the external use of chromic acid solution. No doubt these cases were idiosyncratic, yet the fact remains and should be heeded.—*Monthly Cyclopedia.*

ELECTRIC CURRENT CAUSES SUIT.—Eight dentists in Worcester, Mass., have sued the electric light company of the town for damages averaging about $150 each. They claim that their electrical apparatus has been rendered useless since the company changed its service from a 110 volt direct to a 104 volt alternating current.

TEETH OF SMALL VALUE.—Two men in Chicago recently had a fight and one of them knocked out seven of the other's teeth. The victim sued for $185 damages, but the justice awarded him only one cent, and remarked that the defendant had saved him a dentist's bill, as the teeth must have needed pulling anyhow if they came out so easily.

CLEVER SCHEME.—Doctor: "Did you take the rhubarb I prescribed for you?"

Patient: "Faith an' Oi did so."

Doctor: "How did you take it?"

Patient: "In a poi, b'gorry!"—*Chicago News.*

ORAL HYGIENE IN THE PUBLIC SCHOOLS.—Give me the school children of this country, and I will annihilate the dental parlor, rob quackery of its victims, solve state examining board problems, win the eternal gratitude of dental faculties, and place the dental profession upon the highest pinnacle of public favor.—DR. A. IRWIN, *Items.*

ONLY A DREAM.

We had a dream the other night,
When everything was still;
We dreamed that each subscriber
Came right up and paid his bill.—*Ex.*

INFLUENCE OF INFLAMED GUMS ON UNERUPTED TEETH.—Inflamed gums as a cause of gland trouble in infants are not to be lightly thought of. In a weakly infant I have often seen a gland remain enlarged and finally suppurate from this cause. I leave it to you to decide what effect an incision into an inflamed and turgid gum will have on the teeth, but I am fully convinced that a timely prick in such cases may save future trouble in the form of tubercular or suppurating glands.—GEO. MORGAN, *Brit. Dent. Jour.*

RECOVERY IMPOSSIBLE.—"I am happy to tell you, madam," said the lawyer to the wife of the railway accident's victim, "that your husband can recover."

"Oh, doctor, I am so thankful——"

"Madam, I am a lawyer, not a doctor, and I have reference to damages, not health. He, of course, cannot live."—*Ex.*

WORKED THE WRONG WAY.—"That was a mean trick that Mayme's little brother played on her."

"What was it?"

"Why, she put a piece of wedding cake under her pillow to sleep on, you know, and he stole it and ate it, and put a piece of limburger cheese in its place, and she dreamed she was buried alive."—*Ex.*

SPREADING CEMENT IN ROOT-FILLING.—Here is a little trick that occasionally serves me in conservative treatment of the pulp. With the dressing and cap in position, mix a bit of cement to the consistency of thick cream and place a drop upon the cap. A few quick, vigorous, and properly directed puffs from the air syringe will spread the cement nicely over the cap and dressing, and without exerting pressure. When set this serves to hold the cap in place while the filling proper is inserted.—L. S. EDWARDS, *Cosmos.*

WHAT MARY HAD.

Mary had a little lamb,
Likewise an oyster stew,
Salad, cake, a piece of pie,
And a bottle of pale brew—
Then a few hours later
She had a doctor, too.—*Chicago News.*

ROBBERIES.—A. C. Barr, Alton, Ill., Jan. 27, $50.—R. L. Munn, Freeport, Ill., Feb. 8, $250.—H. S. Robinson, Attleboro, Mass., Jan. 27, $50.—C. E. Fitzgerald, St. Louis, Jan. 30, $25.—T. S. Dunning, Paterson, N. J., Feb. 1, $30.—Dart Dental Parlors, Cincinnati, Jan. 31, $300.—C. H. Sherman, Columbus, O., Feb. 9, $30.—A. T. Good, Hamilton, O., Jan. 25, $20.—A. L. Hollowell, Hamilton, O., Jan. 25, $10.—C. S. Kelsey, Elyria, O., Feb. 15, $50.—J. H. Drexler, Frankford, Pa., Feb. 13, $100.—J. C. Gable, Lancaster, Pa., Feb. 18, $15.

A MERRY JESTER.—"I have decided to study dentistry," said the young man.

"It is a fine profession, but do you think it would suit your tastes?"

"I am sure of it. You see I am naturally a great practical joker. I don't believe I would enjoy anything more than to fill a man's mouth with rubber, mortar, zinc fillings, carbolic acid and Turkish toweling, and after getting a firm grip on his jaw, tell him he must be sure to let me know if I am hurting him."—*Washington Star.*

ILLEGAL PRACTITIONERS.—Last month a man in Kentucky was indicted by the grand jury for illegal practice of dentistry, and promptly left the state.—Jan. 20 four students in Louisville pleaded guilty to the charge of practising dentistry without a license and were each fined $50.—Feb. 4 three men in Trenton, N. J., were arrested for practising dentistry unlawfully.—Jan. 29

a man in Rochester, N. Y., was fined for practising dentistry without being registered.—Feb. 1 a dental student in Philadelphia pleaded guilty to practising without a license and was fined $50.

TELEPHONES CAUSE BROKEN ENGAGEMENTS.—Dentists in several of the large cities are seriously considering having their telephones removed from their offices, as they find that this convenience makes it altogether too easy for patients, women especially, to break engagements at the last moment. To remove the 'phones would be a very cowardly and unprofessional solution of the difficulty. Every self-respecting practitioner should place enough value on his time to charge at regular rates for broken appointments unless notice is given by the patient at least twenty-four hours in advance.

BREAKING OF A VULCANITE DENTURE.—Another fertile cause of the breaking of a vulcanite denture is not recognizing the fact that each natural tooth on the model makes an indentation in the rubber. Now, if one when molding the wax to such a model should get it attenuated or thinned over the convexity represented by the tooth, then one has a weak spot that does not require much of a strain to snap the case in halves; so that too much care cannot be exercised in keeping the contour of the model, so that the rubber plate may present as nearly as possible an even thickness.—HARRY ROSE, *Jour. Brit. Dent. Assn.*

MIXED.

He had an all-consuming thirst,
  Drank everything in sight,
And this same thirst caused Weary Bill's
  Tired soul to wing its flight;
He found a jug and quenched his thirst;
  His face no more we'll see;
He thought it was C_2H_6O,
  It was HNO_3.—*Ex.*

TECHNICAL EQUIVALENT OF A "SPOONFUL."—According to the *Dom. Med. Monthly,* the French *Codex* states that a spoon is full when the liquid it contains comes up to but does not show a curve above the upper edge or rim of the bowl. The Philadelphia College of Pharmacy has recently resolved upon promulgating this definition and has been endorsed by the American Pharmaceutical Association. The equivalents with the metric system of weights and measures are as follows: One spoonful, five cubic centimeters; one dessertspoonful, ten cubic centimeters; one tablespoonful, three teaspoonfuls, or fifteen cubic centimeters.

EXAMINING BOARD AFFAIRS.—Feb. 6 the law regulating the practice of dentistry in the District of Columbia was amended, and now provides that the board of examiners instead of requiring an examination may issue a license to practice to any dentist who has been in practice for five years or more on the certificate of the dental examining board of the state in which he practiced.—Feb. 10 the law regulating the practice of dentistry in Kentucky was changed.—Feb. 2 the governor of Mississippi appointed the following dentists as members of the state examining board: G. B. Clement, Macon;

G. B. Stewart, Greenwood; P. P. Walker, Brandon; J. P. Broadstreet, Grenada; P. H. Wright, Oxford.—A dentist in Columbus, O., recently brought a mandamus suit against the state board of examiners to compel them to grant him a license to practice without passing an examination, but the court decided against him.—An individual in Seattle has brought mandamus proceedings against the state dental board to compel them to issue him a license.

GUTTA-PERCHA FOR ABRASION.—In cases of moderate exposure to abrasion I have had great success with high heat gutta-percha as a filling material. In the preparation of the cavity avoid long bevels and obtain as well defined undercuts as the case permits. Disinfect the cavity with hydronaphthol, dry thoroughly with hot air, and line with a compound of the resin of Pinus sylvestris (fiddle-bow resin) and alcohol—4 drams of the former dissolved in 2½ drams of absolute alcohol. Line cavity with thin cement and insert the gutta-percha before cement sets, taking care not to use too much gutta-percha—preferably insert in small pellets—and finish with warm instruments. —*R. B. Colvin,* Berlin, Pa.

FIRES.—G. G. Jordan, Toronto, Can., Feb. 9, loss $300, fully insured.—W. C. Mattox, Elberton, Ga., Jan. 28, loss $600, no insurance.—J. R. Warren, Stillman, Ga., Feb. 4, loss $300.—Sovereign Bros., Chicago, Feb. 21, loss $100. —F. T. Bell, Aurora, Ill., Feb. 5, loss $100.—E. Miller, Chicago, Jan. 23, loss $100.—C. Wyckoff, East St. Louis, Ill., Feb. 14, loss $200.—E. A. Marsland, Montpelier, Ind., Jan. 24, loss $50, fully insured.—F. Primrose, S. L. LeCron, S. S. Brotherton, all of Baltimore, Feb. 7, total loss, fully covered by insurance.—United States Dental Parlors, Philadelphia Dental Parlors, Baltimore, Feb. 7, total loss.—C. M. Cox, Columbia, Miss., Jan. 25, loss $300. —H. Eaton, Sour Lake, Tex., Jan. 24, total loss.—J. B. Kennedy, Rockwall, Tex., Jan. 21, loss $400.

ACCIDENTS.—J. E. McLaughlin, a dentist at Assumption, Ill., was badly burned by the explosion of a vulcanizer, which in turn burst a lighted alcohol lamp, Feb. 4.—Last month a farmer in southern Illinois had a tooth extracted and almost bled to death before the hemorrhage could be stopped. Physicians worked over him four days.—Feb. 10 a young woman in Nebraska almost died from an overdose of chloroform given by a dentist prior to tooth extraction. It took several hours' work to revive her.—Feb. 1 a dentist in Las Vegas, N. M., accidentally cut his thumb against the ragged edge of a tooth in the mouth of a patient, and a serious attack of blood poisoning ensued.—A man in Philadelphia recently recovered from a seven weeks' illness caused by an impure drug administered by a dentist.

THOROUGH MALLETING OF CONTACT-POINT IN APPROXIMAL GOLD FILLINGS.—In gold fillings the contact-point should receive more than the ordinary amount of malleting, and in this connection it may be stated that if for no other reason than this a matrix is indicated in filling these cavities when they occur on the distal surfaces of the teeth. With a thin matrix lying between the filling and the approximal tooth, the gold may be solidly driven against the contact-point of the tooth without injury to the enamel on account of

the protection afforded it by the matrix, and when the filling has been properly contoured and hardened and the matrix removed, the gold will be found in perfect contact with the approximal tooth, and with very little finishing necessary to make a good surface.—C. N. JOHNSON, *Dominion.*

COMEDY OF ERRORS.—One night recently there were several people awaiting their turn in a dental parlor in Brooklyn to have toothache and other dental ills relieved. A stray cat made his way into the apartment over the parlor, and the family set the house on fire in their efforts to drive the animal out. The various members of the family rushed downstairs, giving the alarm, and hitting only the high places. All the patients left the dental parlors hurriedly, one of the first being a man who had just sat down in the chair to have three teeth pulled. He departed in possession of two, but left one with the dentist. After the fire was extinguished most of the patients returned, but the cat and the man with the two aching teeth have not been heard from.

MARRIAGES.—A. S. Andrew, a dentist of West Superior, Wis., was married to Miss Anna L. Shuning of New York, Feb. 6.—R. E. Burns, a dentist of San Jose, Cal., was married to Miss Mary D. Pierce of Moscow, Idaho, Jan. 23.—Arthur Burton, a dentist of Whitesboro, Tex., was married to Miss Tillie M. DeShields of Farmersville, Tex., Jan. 29.—R. E. Jones, a dentist of Remsen, N. Y., was married to Miss Georgia L. Morey of Utica, N. Y., Feb. 18.—W. L. Potter, a dentist of Garber, Okla., was married to Miss Jennie Bruce of Garber, Dec. 24.—R. E. Thompson, a dentist of Dolgeville, N. Y., was married to Miss Pearl Coxe of North Gage, N. Y., Jan. 28.—F. M. Welch, a dentist of Linton, Ind., was married to Miss Mary Barnes of Kelly Bend, Ind., Feb. 7.—S. F. Way, a dentist of Livingston, Mont., was married to Miss Libbie Wakefield of Gardner, Mont., Jan. 27.

PYORRHEA.—When the destruction caused by pyorrhea can no longer be made good, we need not for that reason speak of incurability. If we succeed in arresting the purulence the pyorrhea is cured, and this succeeds only when we are able to remove every trace of subgingival tartar deposits. No one will of course expect that it is possible to refix a loose tooth the alveolus of which the presence of pus has caused to disappear up to the apex of the root. Loose teeth, however, may become fixed again if a part of the alveolus remains still healthy, if about a third of the tooth still stands in healthy bone, or, in other words, if the lost third of the tooth in the direction of the apex of the root has remained free of deposits. In teeth with several roots the conditions are somewhat different if the pathological process has not progressed to an equal extent with all the roots.—ALBERT SENN, *Quarterly Circular.*

BLEACHED SHELLAC.—Although many processes have been suggested for the preparation of this, only one is used to any extent on a practical scale. This process is a modification of the original one proposed by Willstein, omitting the alcohol, which is as unnecessary as it is expensive. The shellac is dissolved in a suitable alkaline solvent and treated with chlorinated lime.

An alkaline carbonate being used, the lime eventually settles as a corbonate, and the full action of the sodium hypochlorite in solution is exerted. The solution is treated with sulphuric acid, which precipitates the shellac in a nearly colorless form. Bleached shellac retains a large quantity of water, even when in a quite hard state. It probably retains some chlorin, which would entirely vitiate any method of analysis depending on an iodin-estimation; but the presence of rosin in bleached shellac is easy to detect, and an approximate determination of it can be made.—E. J. PARRY, *Chemist and Druggist.*

ALCOHOL CORRODES.—The action of alcohol on metal is peculiar. Dr. Malmejac in his experiments used ninety-five per cent alcohol, which left no residue on evaporation. The metals, copper, iron, tin, lead, zinc, and galvanized iron, were corked up with alcohol in glass flasks and kept at ordinary temperatures for six months. The copper was entirely unacted upon, but in all the other flasks there was a deposit on the bottom and the metal was covered with a similar deposit. In the case of tin, lead, zinc, and galvanized iron the deposit was white; that from the iron was red, resembling iron rust. All of the liquids, except that in which the lead had been placed, filtered clear; the latter retained a milky appearance after repeated filterings through double filters. The clear filtrates from iron, lead, zinc and galvanized iron gave much residue on evaporation, while the residue from tin was hardly appreciable. In the former cases it is clear that not only had the metal been oxidized, but a considerable quantity had entered into the solution. These experiments have an important bearing on the storing and shipping of alcohol.—*Science.*

DANGERS OF HEROIN.—Among recent synthetic products none is more widely used than heroin—an artificial or rather synthetic morphin salt, which many physicians employ with the idea that it is a harmless succedaneum for morphin. On the contrary, it has all the dangers of morphin salts in general and additional dangers of its own. The writer has seen suppression of urine and threatening coma from small doses of heroin (one-twelfth grain) prescribed to check cough or relieve pain. Especially dangerous are the trade preparations containing heroin—the composition being sometimes expressed in their proprietary titles and sometimes not. These combinations are widely advertised as cough syrups, asthma cures, etc. Preparations of this character should never be used by physicians, who should be able to make their own combinations with or without morphin, and adapted to the needs of the individual case before them. Heroin is one of the most toxic agents of the morphin group. It has its legitimate uses, uncombined, in small, carefully watched, infrequent doses; but not with the idea that it is anything else than a morphin salt.—S. S. COHEN, M. D., *American Medicine.*

DAMAGE SUITS.—A dental parlor in Los Angeles has been sued for $25,000 damages by the mother of a youth who claims that one of the operators left a root in the boy's jaw after extracting a tooth, and that he has since been forced to undergo surgical operations in consequence.—Feb. 9 a woman in Boston was awarded $1,000 damages against a dental parlor in that city. She claimed that when extracting a tooth one of the dentists broke it and left

a part in her gum, which caused her great suffering.—A man brought suit against a dental parlor in St. Louis Feb. 15 for $4,500 damages, alleging that while one of the operators was working on him an instrument slipped and cut a deep gash in his mouth, resulting in blood poisoning.—A man in New York has served a summons on the proprietor of a dental parlor to compel him to return a set of teeth for which the man paid but which he returned to be altered because they did not fit.—A dentist in Pittsburg recently brought suit against a patient to recover money due for dental services. The defendant has filed a counter claim of equal amount, alleging that the work was improperly done so that it all had to be replaced by another dentist.—A Milwaukee dentist recently brought suit against a man to recover $16 for dental services for the latter's daughter, but the justice ruled for the defendant, because the daughter was twenty-one years old when the work was done.

CHEMICALLY PURE ETHYL CHLORID AS A GENERAL ANESTHETIC.—The number of cases which have been subjected to general anesthesia with ethyl chlorid, says Vacher, can now be counted by the thousands. This comprises the use of the drug in infants, adolescents, adults and old men. He has not had a single dangerous symptom to discourage him.

It is important that the drug be chemically pure. A cone is covered with paper, and into this cone from one-half to one dram of ethyl chlorid is poured. This is placed over the patient's nose and mouth, and he is told to breathe deeply. In fifteen to thirty-five seconds complete anesthesia is accomplished without any muscular spasm. If the anesthetic is then withdrawn recovery takes place within the minute. If the drug is continued there develops a period of contracture, myosis and abolition of the corneal reflex. In a few seconds more there is complete muscular relaxation. The patient snores. There is mydriasis, but no stenosis. There is no trismus, as is often observed in the use of ethyl bromid. The anesthesia, which is obtained in thirty or forty seconds at the maximum, lasts from two to three minutes. If a more prolonged anesthesia is needful a fresh dose of the drug is given as soon as the patient begins to become conscious. Often a small dose may be administered, producing anesthesia for at least ten to fifteen minutes. The recovery is extremely prompt. There is no headache, no vomiting, and in a few minutes the patient is able to get up and walk.

Vacher, if the operations require more than a few minutes, precedes the administration of chloroform by ethyl chlorid, thus obtaining complete narcosis in four minutes, sometimes in three. It has never required more than six minutes. Ethyl chlorid is given for thirty to forty seconds, then the chloroform mask is applied. This entirely suppresses the period of excitement.

Ethyl bromid, which resembles in its action ethyl chlorid, is more easily decomposed, more readily produces cyanosis or trismus, and acts in a more lethal manner upon the bulb. Patients on recovering from it experience hebetude and prostration. The eradication of the bromid requires forty-eight hours, and is signalized by the disappearance of the garlicky odor from the breath.—*Therapeutic Gazette.*

LIBEL OF PHYSICIAN BY CALLING HIM A "QUACK."—A newspaper said, so states the *Jour. A. M. A.*, that a certain candidate for office might as well give up the fight. It had supposed that he had at least a fighting chance, if not an absolutely sure thing. "But," it continued, "here comes 'Doctor' Ralph Elmergreen, the spick and span practitioner, who says that it's all off, and that all the powers of hades can't prevent Sam's reelection. The burden of the doctor's refrain is vindication—for Sammy. It appears that some untruthful Democrat misquoted Sam's Hartford speech, particularly that portion of it concerning the regulation of trusts. We do not know what Barney said about trusts; neither do we care. Sufficient be it that we do not look to a quack to set us right in the matter. . . ." An action for libel followed. Evidence was produced on behalf of the party sued, who was the editor, publisher and proprietor of the paper, to the effect that he knew that the party suing was a physician and surgeon, but that he had no intention of injuring him in his professional capacity. There was also evidence introduced on behalf of the publisher in regard to the various dictionary definitions of the word "quack." The result was a verdict and judgment for the publisher. But this last is reversed by the Supreme Court of Wisconsin, and a new trial ordered. It says, Elmergreen vs. Horn, that it was correctly ruled that to speak of a physician in his professional capacity as a "quack" is to call him a mere pretender, a person boasting of attainments he does not possess, and is libelous as a matter of law. It was further correctly ruled that in a case of this kind if there are conflicting reasonable inferences as to whether the alleged libelous language should be understood in a libelous sense, the right of the matter must be determined by a jury. The trial judge concluded that there was such a conflict in this case, and refused to give instructions to the jury in effect, taking away from it the question of whether the article complained of was libelous *per se*, or in and of itself; and that is what the Supreme Court says was reversible error. Candor, it declares, compels it to say that it can not discover any doubt, approaching the boundaries of reason, as to whether the term "quack" was used with reference to the party suing in his capacity as a physician and surgeon. Taking the language all together, with the same certainty as it referred to him as doctor, it referred to him as a quack doctor, as a mere pretender in his profession, a person not possessing the skill of a reputable practitioner of medicine, though assuming to have such skill. Note, it says, for one thing, the significance of the inclosure of the word "Doctor" in quotation marks, indicating that the writer wished to dignify him by the title of doctor in no other sense than that he was so called or held himself out to the world as such. And finally the Supreme Court says that it would be a waste of time to multiply words in demonstrating that the only meaning suggested by reading the article in question was that the party suing was referred to therein as a quack doctor. If the learned circuit judge had not considered the matter doubtful, the court would feel that one could not seriously present it for consideration from the standpoint of the party sued. That the judge erred in submitting the primary question of the latter's ability to the jury, the court regards as so clear that it is not justified in saying more.

HOW THE DENTIST CAME IN HEAVEN.

When Dock had tired of life's turmoil,
Had shuffled off this mortal coil,
'Twas wondered much how one so given
To nameless sins should live in heaven.
But this, I'm told, is how it came,
When flickered out this earthly flame,
His spirit knowing justice well,
Flew down before the gate of hell;
He knocked; "Who's there?" the answer came.
"Dock ——, sir, that is my name;
I have a beastly load of sin,
So open the gate and let me in."
"Can't do it," said the porter, quick,
"You'll have to wait, the devil is sick;
For yesterday, while making dinner,
Upon a fat, ungodly sinner,
He broke the largest fang he had,
And has the toothache hellish bad."
"Hold on," says Dock, "that's just my trade;
I'm a dentist, sir; the best that's made.
Just let me in, and, sure as truth,
I'll quickly ease the boss' tooth!"
The gate flew open, and in he went,
Conducted to the devil's tent,
Where, on a pile of sinners' skins,
Old Cooty sat and ghastly grinned.
Old Serpent stooped and eyed him well,
Then said he'd make him king of hell,
Where unmolested he might reign,
If he would only ease his pain.
Dock opened his valise and took
His forceps out with knowing look,
And bade the devil spread his jaws,
And hold his breath and clinch his claws,
Put on the pullers, gave a jerk,
Out came the tooth, 'twas speedy work;
But to the tooth, alas! there clung
Full half the jawbone and the tongue,
And Dock says, "As recompense
I'll only charge you fifty cents."
The devil rose, he did not speak,
Nor did he want to, words were weak;
But, seizing Dock, he showed the skill
The Devil has of paying bills;
With one wild kick done up in state
He landed Dock beyond the gate,
And then it was the fact befell,
He banished dentists all from hell.

—*W. B. Armstrong, D.D.S.*, Albany, Ky.